



# wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 20, 2026 – 12:09 PM UTC

PDB ID : 7KPC / pdb\_00007kpc  
Title : Dihydrodipicolinate synthase (DHDPS) from *C.jejuni*, E88Q mutant with pyruvate bound in the active site and L-lysine bound at the allosteric site  
Authors : Saran, S.; Sanders, D.A.R.  
Deposited on : 2020-11-10  
Resolution : 1.76 Å (reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity : 4-5-2 with Phenix2.0  
Mogul : 2022.3.0, CSD as543be (2022)  
Xtrriage (Phenix) : 2.0  
EDS : 3.0  
Buster-report : wwPDB partial adaption of 1.1.7 (2018)  
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)  
CCP4 : 9.0.010 (Gargrove)  
Density-Fitness : 1.0.12  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.49

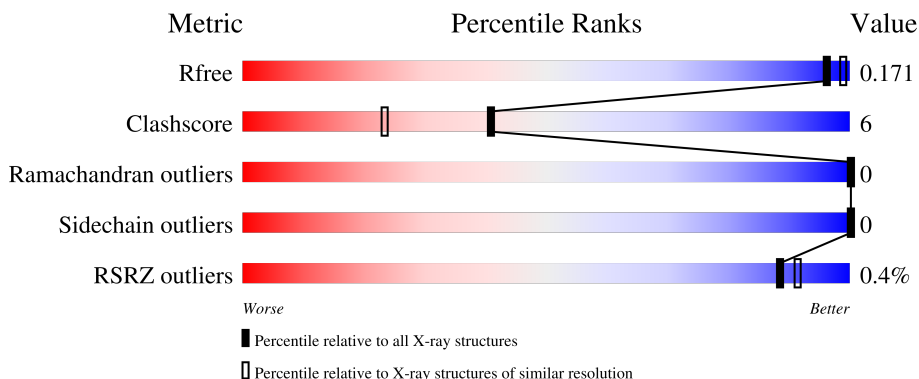
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.76 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)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	180053	3183 (1.76-1.76)
Clashscore	190562	3299 (1.76-1.76)
Ramachandran outliers	187476	3274 (1.76-1.76)
Sidechain outliers	187428	3274 (1.76-1.76)
RSRZ outliers	180081	3183 (1.76-1.76)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	310	 83% 12% 5%
1	B	310	 86% 9% 5%
1	C	310	 85% 11% 5%
1	D	310	 86% 9% 5%
1	E	310	 86% 8% 5%

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Mol	Chain	Length	Quality of chain
1	F	310	 86% 9%

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	LYS	C	301	-	-	X	-
4	ACT	C	303	-	-	X	-
4	ACT	E	304	-	-	X	-
5	EDO	A	311	-	-	X	-
5	EDO	C	308	-	-	X	-
5	EDO	C	309	-	-	X	-
5	EDO	F	307	-	-	X	-
6	PGE	C	311	-	-	X	-
7	PEG	C	313	-	-	X	-
7	PEG	C	317	-	-	X	-
7	PEG	D	316	-	-	X	-
8	GOL	B	312	-	X	X	-

## 2 Entry composition [i](#)

There are 9 unique types of molecules in this entry. The entry contains 15646 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, 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 4-hydroxy-tetrahydrodipicolinate synthase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	295	2260	1435	372	440	13	0	2	0
1	B	296	2275	1444	378	440	13	0	2	0
1	C	297	2311	1466	387	445	13	0	4	0
1	D	296	2269	1441	379	436	13	0	1	0
1	E	296	2275	1446	376	440	13	0	1	0
1	F	297	2269	1442	376	438	13	0	0	0

There are 78 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-11	MET	-	expression tag	UNP Q9PPB4
A	-10	ARG	-	expression tag	UNP Q9PPB4
A	-9	GLY	-	expression tag	UNP Q9PPB4
A	-8	SER	-	expression tag	UNP Q9PPB4
A	-7	HIS	-	expression tag	UNP Q9PPB4
A	-6	HIS	-	expression tag	UNP Q9PPB4
A	-5	HIS	-	expression tag	UNP Q9PPB4
A	-4	HIS	-	expression tag	UNP Q9PPB4
A	-3	HIS	-	expression tag	UNP Q9PPB4
A	-2	HIS	-	expression tag	UNP Q9PPB4
A	-1	GLY	-	expression tag	UNP Q9PPB4
A	0	SER	-	expression tag	UNP Q9PPB4
A	88	GLN	GLU	engineered mutation	UNP Q9PPB4
B	-11	MET	-	expression tag	UNP Q9PPB4
B	-10	ARG	-	expression tag	UNP Q9PPB4
B	-9	GLY	-	expression tag	UNP Q9PPB4
B	-8	SER	-	expression tag	UNP Q9PPB4

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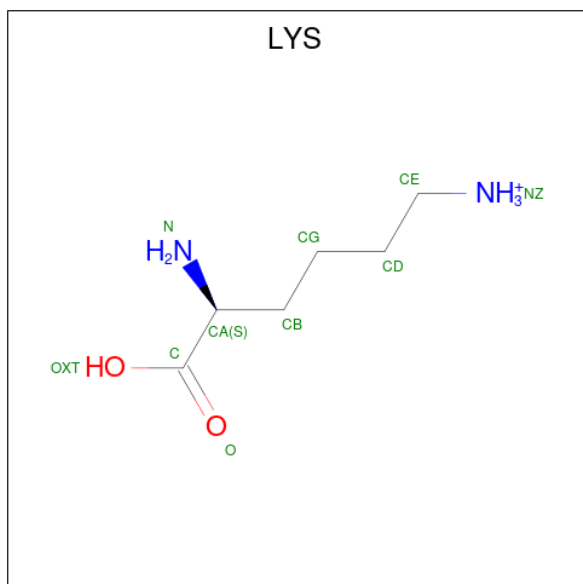
Chain	Residue	Modelled	Actual	Comment	Reference
B	-7	HIS	-	expression tag	UNP Q9PPB4
B	-6	HIS	-	expression tag	UNP Q9PPB4
B	-5	HIS	-	expression tag	UNP Q9PPB4
B	-4	HIS	-	expression tag	UNP Q9PPB4
B	-3	HIS	-	expression tag	UNP Q9PPB4
B	-2	HIS	-	expression tag	UNP Q9PPB4
B	-1	GLY	-	expression tag	UNP Q9PPB4
B	0	SER	-	expression tag	UNP Q9PPB4
B	88	GLN	GLU	engineered mutation	UNP Q9PPB4
C	-11	MET	-	expression tag	UNP Q9PPB4
C	-10	ARG	-	expression tag	UNP Q9PPB4
C	-9	GLY	-	expression tag	UNP Q9PPB4
C	-8	SER	-	expression tag	UNP Q9PPB4
C	-7	HIS	-	expression tag	UNP Q9PPB4
C	-6	HIS	-	expression tag	UNP Q9PPB4
C	-5	HIS	-	expression tag	UNP Q9PPB4
C	-4	HIS	-	expression tag	UNP Q9PPB4
C	-3	HIS	-	expression tag	UNP Q9PPB4
C	-2	HIS	-	expression tag	UNP Q9PPB4
C	-1	GLY	-	expression tag	UNP Q9PPB4
C	0	SER	-	expression tag	UNP Q9PPB4
C	88	GLN	GLU	engineered mutation	UNP Q9PPB4
D	-11	MET	-	expression tag	UNP Q9PPB4
D	-10	ARG	-	expression tag	UNP Q9PPB4
D	-9	GLY	-	expression tag	UNP Q9PPB4
D	-8	SER	-	expression tag	UNP Q9PPB4
D	-7	HIS	-	expression tag	UNP Q9PPB4
D	-6	HIS	-	expression tag	UNP Q9PPB4
D	-5	HIS	-	expression tag	UNP Q9PPB4
D	-4	HIS	-	expression tag	UNP Q9PPB4
D	-3	HIS	-	expression tag	UNP Q9PPB4
D	-2	HIS	-	expression tag	UNP Q9PPB4
D	-1	GLY	-	expression tag	UNP Q9PPB4
D	0	SER	-	expression tag	UNP Q9PPB4
D	88	GLN	GLU	engineered mutation	UNP Q9PPB4
E	-11	MET	-	expression tag	UNP Q9PPB4
E	-10	ARG	-	expression tag	UNP Q9PPB4
E	-9	GLY	-	expression tag	UNP Q9PPB4
E	-8	SER	-	expression tag	UNP Q9PPB4
E	-7	HIS	-	expression tag	UNP Q9PPB4
E	-6	HIS	-	expression tag	UNP Q9PPB4
E	-5	HIS	-	expression tag	UNP Q9PPB4

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Chain	Residue	Modelled	Actual	Comment	Reference
E	-4	HIS	-	expression tag	UNP Q9PPB4
E	-3	HIS	-	expression tag	UNP Q9PPB4
E	-2	HIS	-	expression tag	UNP Q9PPB4
E	-1	GLY	-	expression tag	UNP Q9PPB4
E	0	SER	-	expression tag	UNP Q9PPB4
E	88	GLN	GLU	engineered mutation	UNP Q9PPB4
F	-11	MET	-	expression tag	UNP Q9PPB4
F	-10	ARG	-	expression tag	UNP Q9PPB4
F	-9	GLY	-	expression tag	UNP Q9PPB4
F	-8	SER	-	expression tag	UNP Q9PPB4
F	-7	HIS	-	expression tag	UNP Q9PPB4
F	-6	HIS	-	expression tag	UNP Q9PPB4
F	-5	HIS	-	expression tag	UNP Q9PPB4
F	-4	HIS	-	expression tag	UNP Q9PPB4
F	-3	HIS	-	expression tag	UNP Q9PPB4
F	-2	HIS	-	expression tag	UNP Q9PPB4
F	-1	GLY	-	expression tag	UNP Q9PPB4
F	0	SER	-	expression tag	UNP Q9PPB4
F	88	GLN	GLU	engineered mutation	UNP Q9PPB4

- Molecule 2 is LYSINE (CCD ID: LYS) (formula: C<sub>6</sub>H<sub>15</sub>N<sub>2</sub>O<sub>2</sub>) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	
			Total	C	N			O
2	A	1	10	6	2	2	0	0

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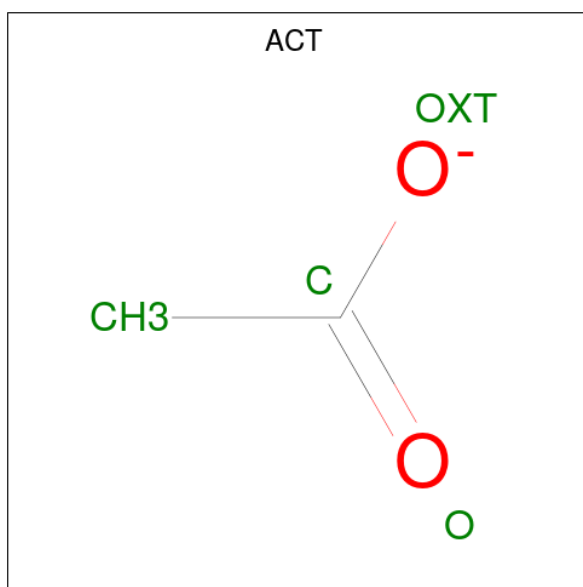
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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	B	1	Total	C	N	O	0	0
			10	6	2	2		
2	C	1	Total	C	N	O	0	0
			10	6	2	2		
2	D	1	Total	C	N	O	0	0
			10	6	2	2		
2	E	1	Total	C	N	O	0	0
			10	6	2	2		
2	F	1	Total	C	N	O	0	0
			10	6	2	2		

- Molecule 3 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	6	Total	Mg	0	0
			6	6		
3	B	3	Total	Mg	0	0
			3	3		
3	C	1	Total	Mg	0	0
			1	1		
3	D	1	Total	Mg	0	0
			1	1		
3	E	2	Total	Mg	0	0
			2	2		
3	F	1	Total	Mg	0	0
			1	1		

- Molecule 4 is ACETATE ION (CCD ID: ACT) (formula: C<sub>2</sub>H<sub>3</sub>O<sub>2</sub>) (labeled as "Ligand of Interest" by depositor).



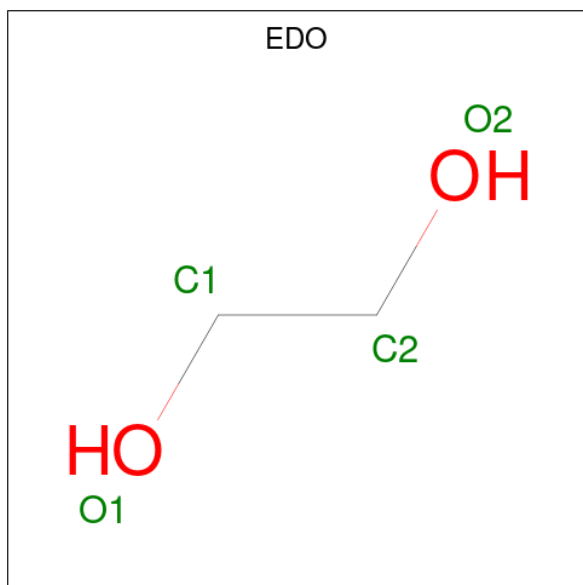
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	D	1	Total C O 4 2 2	0	0
4	D	1	Total C O 4 2 2	0	0
4	D	1	Total C O 4 2 2	0	0
4	E	1	Total C O 4 2 2	0	0
4	E	1	Total C O 4 2 2	0	0
4	E	1	Total C O 4 2 2	0	0
4	F	1	Total C O 4 2 2	0	0

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	F	1	Total	C	O	0	0
			4	2	2		

- Molecule 5 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula:  $C_2H_6O_2$ ) (labeled as "Ligand of Interest" by depositor).



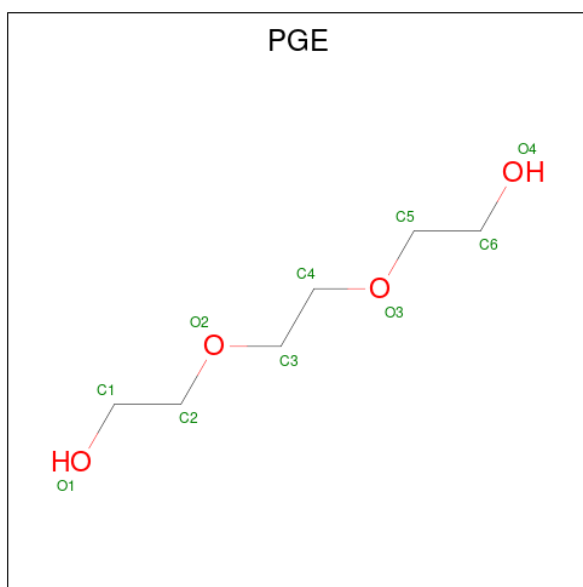
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			4	2	2		
5	A	1	Total	C	O	0	0
			4	2	2		
5	A	1	Total	C	O	0	0
			4	2	2		
5	A	1	Total	C	O	0	0
			4	2	2		
5	B	1	Total	C	O	0	0
			4	2	2		
5	B	1	Total	C	O	0	0
			4	2	2		
5	B	1	Total	C	O	0	0
			4	2	2		
5	B	1	Total	C	O	0	0
			4	2	2		
5	C	1	Total	C	O	0	0
			4	2	2		
5	C	1	Total	C	O	0	0
			4	2	2		

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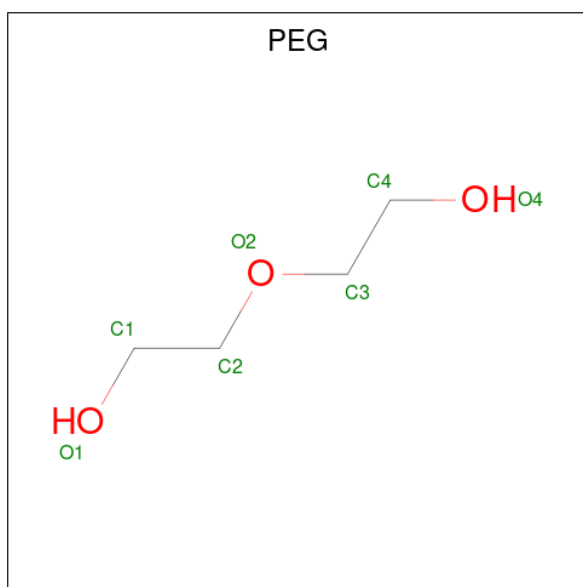
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	C	1	Total C O 4 2 2	0	0
5	C	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0
5	E	1	Total C O 4 2 2	0	0
5	E	1	Total C O 4 2 2	0	0
5	E	1	Total C O 4 2 2	0	0
5	E	1	Total C O 4 2 2	0	0
5	F	1	Total C O 4 2 2	0	0
5	F	1	Total C O 4 2 2	0	0
5	F	1	Total C O 4 2 2	0	0
5	F	1	Total C O 4 2 2	0	0
5	F	1	Total C O 4 2 2	0	0

- Molecule 6 is TRIETHYLENE GLYCOL (CCD ID: PGE) (formula: C<sub>6</sub>H<sub>14</sub>O<sub>4</sub>) (labeled as "Ligand of Interest" by depositor).



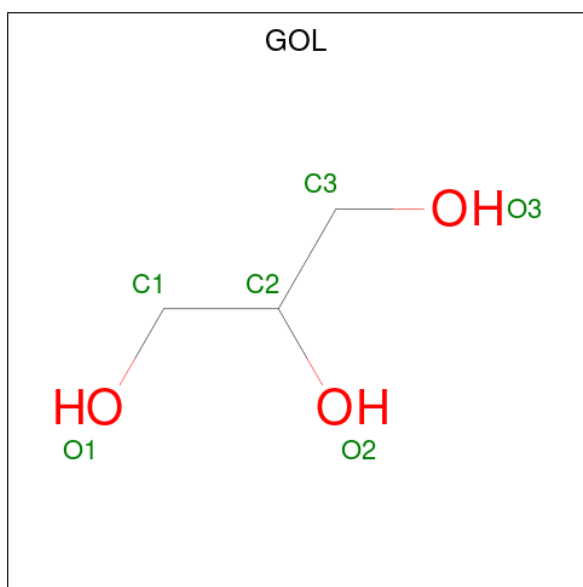
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C O 10 6 4	0	0
6	A	1	Total C O 10 6 4	0	0
6	B	1	Total C O 10 6 4	0	0
6	C	1	Total C O 10 6 4	0	0
6	C	1	Total C O 10 6 4	0	0
6	D	1	Total C O 10 6 4	0	0
6	D	1	Total C O 10 6 4	0	0
6	D	1	Total C O 10 6 4	0	0
6	E	1	Total C O 10 6 4	0	0
6	F	1	Total C O 10 6 4	0	0

- Molecule 7 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: C<sub>4</sub>H<sub>10</sub>O<sub>3</sub>) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	1	Total C O 7 4 3	0	0
7	B	1	Total C O 7 4 3	0	0
7	C	1	Total C O 7 4 3	0	0
7	C	1	Total C O 7 4 3	0	0
7	C	1	Total C O 7 4 3	0	0
7	C	1	Total C O 7 4 3	0	0
7	C	1	Total C O 7 4 3	0	0
7	C	1	Total C O 7 4 3	0	0
7	D	1	Total C O 7 4 3	0	0
7	F	1	Total C O 7 4 3	0	0
7	F	1	Total C O 7 4 3	0	0
7	F	1	Total C O 7 4 3	0	0

- Molecule 8 is GLYCEROL (CCD ID: GOL) (formula:  $C_3H_8O_3$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	B	1	Total C O 6 3 3	0	0
8	D	1	Total C O 6 3 3	0	0
8	F	1	Total C O 6 3 3	0	0


- Molecule 9 is water.

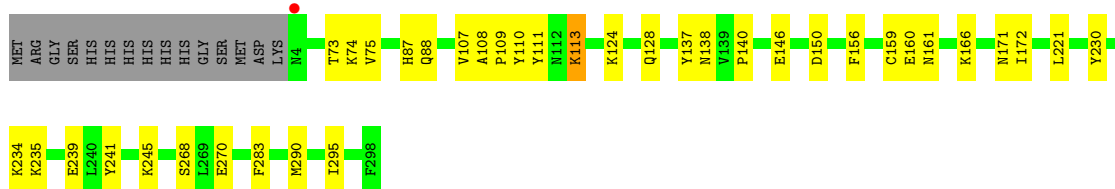
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	A	257	Total O 257 257	0	0
9	B	259	Total O 259 259	0	0
9	C	253	Total O 253 253	0	0
9	D	254	Total O 254 254	0	0
9	E	261	Total O 261 261	0	0
9	F	255	Total O 255 255	0	0

### 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 electron 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 dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). 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.

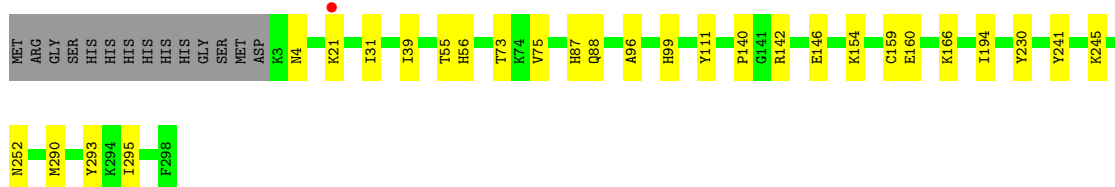
- Molecule 1: 4-hydroxy-tetrahydrodipicolinate synthase

Chain A: 




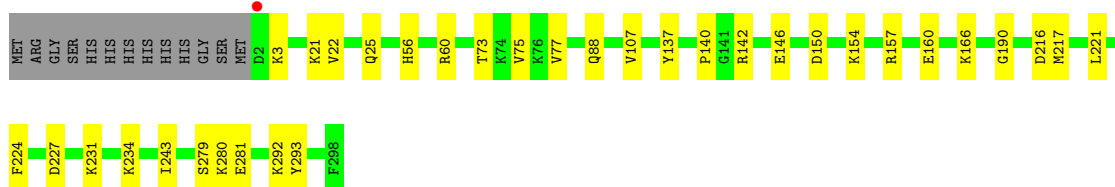
- Molecule 1: 4-hydroxy-tetrahydrodipicolinate synthase

Chain B: 




- Molecule 1: 4-hydroxy-tetrahydrodipicolinate synthase

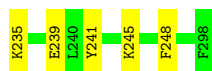
Chain C: 



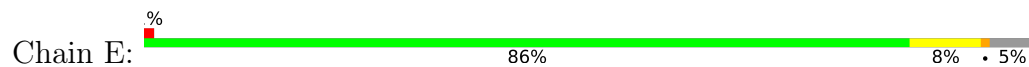
- Molecule 1: 4-hydroxy-tetrahydrodipicolinate synthase

Chain D: 

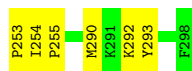
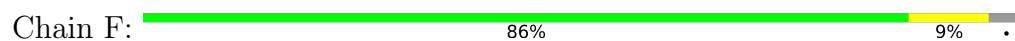




- Molecule 1: 4-hydroxy-tetrahydrodipicolinate synthase



- Molecule 1: 4-hydroxy-tetrahydrodipicolinate synthase



## 4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	85.35Å 231.61Å 199.85Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	43.70 – 1.76 43.70 – 1.76	Depositor EDS
% Data completeness (in resolution range)	99.7 (43.70-1.76) 96.8 (43.70-1.76)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.82 (at 1.76Å)	Xtrriage
Refinement program	PHENIX 1.17.1_3660	Depositor
R, $R_{free}$	0.142 , 0.169 0.146 , 0.171	Depositor DCC
$R_{free}$ test set	9724 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	20.9	Xtrriage
Anisotropy	0.191	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 43.3	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.97	EDS
Total number of atoms	15646	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	25.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.49% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality i

### 5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: MG, PGE, GOL, PEG, KPI, ACT, EDO

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	0.90	11/2284 (0.5%)	0.83	1/3096 (0.0%)
1	B	0.88	8/2299 (0.3%)	0.85	0/3113
1	C	0.82	8/2336 (0.3%)	0.81	0/3159
1	D	0.81	2/2293 (0.1%)	0.84	0/3104
1	E	0.85	9/2299 (0.4%)	0.81	0/3111
1	F	0.79	1/2293 (0.0%)	0.85	1/3104 (0.0%)
All	All	0.84	39/13804 (0.3%)	0.83	2/18687 (0.0%)

The worst 5 of 39 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	113	LYS	C-O	-10.34	1.19	1.23
1	E	293	TYR	C-O	-6.87	1.15	1.24
1	C	22	VAL	C-O	-6.39	1.17	1.24
1	C	21	LYS	C-O	-6.24	1.15	1.23
1	A	283	PHE	C-O	-6.13	1.17	1.24

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
1	A	160	GLU	N-CA-C	5.85	118.41	111.33
1	F	88	GLN	CB-CG-CD	5.38	121.74	112.60

There are no chirality outliers.

There are no planarity outliers.

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

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2260	0	2240	28	0
1	B	2275	0	2272	26	0
1	C	2311	0	2321	41	0
1	D	2269	0	2278	23	0
1	E	2275	0	2283	20	0
1	F	2269	0	2276	28	0
2	A	10	0	12	0	0
2	B	10	0	12	2	0
2	C	10	0	12	7	0
2	D	10	0	12	2	0
2	E	10	0	12	3	0
2	F	10	0	12	1	0
3	A	6	0	0	0	0
3	B	3	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
3	E	2	0	0	0	0
3	F	1	0	0	0	0
4	A	12	0	9	0	0
4	B	4	0	3	0	0
4	C	12	0	9	3	0
4	D	12	0	9	0	0
4	E	12	0	9	3	0
4	F	8	0	6	0	0
5	A	16	0	23	11	0
5	B	16	0	24	2	0
5	C	16	0	24	11	0
5	D	28	0	42	3	0
5	E	16	0	24	2	0
5	F	20	0	30	11	0
6	A	20	0	28	2	0
6	B	10	0	14	1	0
6	C	20	0	27	22	0
6	D	30	0	42	3	0
6	E	10	0	14	5	0
6	F	10	0	14	4	0
7	A	7	0	9	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	B	7	0	10	2	0
7	C	42	0	60	17	0
7	D	7	0	10	6	0
7	F	21	0	30	5	0
8	B	6	0	7	6	0
8	D	6	0	7	2	0
8	F	6	0	7	0	0
9	A	257	0	0	3	0
9	B	259	0	0	4	0
9	C	253	0	0	3	0
9	D	254	0	0	4	0
9	E	261	0	0	1	0
9	F	255	0	0	3	0
All	All	15646	0	14233	184	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 6.

The worst 5 of 184 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)
1:B:56:HIS:HE2	6:C:311:PGE:H4	1.22	1.04
1:F:186:MET:HE1	6:F:310:PGE:H42	1.41	0.99
1:B:88:GLN:HG3	6:C:311:PGE:H5	1.45	0.98
1:D:40:ASP:OD1	8:D:317:GOL:H2	1.65	0.94
1:D:142[A]:ARG:HE	7:D:316:PEG:H21	1.35	0.92

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 X-ray entries followed by that with respect to entries of similar resolution.

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	294/310 (95%)	288 (98%)	6 (2%)	0	100	100
1	B	295/310 (95%)	289 (98%)	6 (2%)	0	100	100
1	C	298/310 (96%)	293 (98%)	5 (2%)	0	100	100
1	D	294/310 (95%)	289 (98%)	5 (2%)	0	100	100
1	E	294/310 (95%)	289 (98%)	5 (2%)	0	100	100
1	F	294/310 (95%)	289 (98%)	5 (2%)	0	100	100
All	All	1769/1860 (95%)	1737 (98%)	32 (2%)	0	100	100

There are no Ramachandran outliers to report.

### 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 X-ray entries followed by that with respect to entries of similar resolution.

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	240/260 (92%)	240 (100%)	0	100	100
1	B	243/260 (94%)	243 (100%)	0	100	100
1	C	249/260 (96%)	249 (100%)	0	100	100
1	D	243/260 (94%)	243 (100%)	0	100	100
1	E	244/260 (94%)	244 (100%)	0	100	100
1	F	243/260 (94%)	243 (100%)	0	100	100
All	All	1462/1560 (94%)	1462 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 14 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	88	GLN
1	D	25	GLN
1	F	201	ASN
1	E	88	GLN
1	E	201	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](#)

6 non-standard protein/DNA/RNA residues are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
1	KPI	A	166	1	11,13,14	1.50	2 (18%)	9,15,17	1.60	2 (22%)
1	KPI	C	166	1	11,13,14	2.03	3 (27%)	9,15,17	4.13	4 (44%)
1	KPI	E	166	1	11,13,14	0.91	1 (9%)	9,15,17	3.01	3 (33%)
1	KPI	B	166	1	11,13,14	1.59	2 (18%)	9,15,17	2.73	3 (33%)
1	KPI	D	166	1	11,13,14	0.90	0	9,15,17	2.91	3 (33%)
1	KPI	F	166	1	11,13,14	1.43	2 (18%)	9,15,17	2.40	3 (33%)

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
1	KPI	A	166	1	-	0/13/14/16	-
1	KPI	C	166	1	-	0/13/14/16	-
1	KPI	E	166	1	-	0/13/14/16	-
1	KPI	B	166	1	-	0/13/14/16	-
1	KPI	D	166	1	-	0/13/14/16	-
1	KPI	F	166	1	-	0/13/14/16	-

The worst 5 of 10 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	166	KPI	O2-CX2	5.04	1.35	1.22
1	A	166	KPI	O-C	3.40	1.32	1.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	166	KPI	O-C	3.30	1.32	1.20
1	B	166	KPI	CB-CA	3.09	1.58	1.53
1	F	166	KPI	O-C	2.61	1.29	1.20

The worst 5 of 18 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	166	KPI	O2-CX2-CX1	-7.13	112.64	121.35
1	C	166	KPI	C1-CX1-CX2	-7.05	111.47	118.11
1	B	166	KPI	O2-CX2-CX1	6.30	129.04	121.35
1	C	166	KPI	O1-CX2-CX1	6.22	129.76	116.50
1	D	166	KPI	O2-CX2-CX1	6.06	128.74	121.35

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	D	166	KPI	1	0

## 5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 88 ligands modelled in this entry, 14 are monoatomic - leaving 74 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	$\# Z  > 2$
7	PEG	F	311	-	6,6,6	0.48	0	5,5,5	0.95	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	ACT	A	309	-	3,3,3	1.69	1 (33%)	3,3,3	1.59	1 (33%)
5	EDO	D	308	-	3,3,3	0.49	0	2,2,2	0.28	0
2	LYS	D	301	-	8,9,9	1.06	0	7,10,10	0.98	0
5	EDO	D	310	-	3,3,3	0.61	0	2,2,2	0.08	0
8	GOL	F	314	-	5,5,5	1.34	1 (20%)	5,5,5	1.63	1 (20%)
4	ACT	E	305	-	3,3,3	2.00	1 (33%)	3,3,3	0.98	0
8	GOL	D	317	-	5,5,5	1.14	0	5,5,5	2.27	3 (60%)
7	PEG	C	315	-	6,6,6	0.53	0	5,5,5	0.41	0
4	ACT	E	304	-	3,3,3	1.17	0	3,3,3	1.77	1 (33%)
4	ACT	D	304	-	3,3,3	1.65	1 (33%)	3,3,3	1.36	0
5	EDO	A	311	-	3,3,3	1.01	0	2,2,2	1.20	0
5	EDO	E	308	-	3,3,3	0.42	0	2,2,2	0.49	0
5	EDO	F	306	-	3,3,3	0.46	0	2,2,2	0.41	0
4	ACT	F	304	-	3,3,3	1.44	1 (33%)	3,3,3	1.40	0
5	EDO	E	310	-	3,3,3	0.41	0	2,2,2	0.52	0
7	PEG	C	313	-	6,6,6	0.52	0	5,5,5	0.82	0
5	EDO	B	309	-	3,3,3	0.44	0	2,2,2	0.21	0
5	EDO	E	307	-	3,3,3	0.37	0	2,2,2	0.74	0
5	EDO	F	308	-	3,3,3	0.35	0	2,2,2	0.59	0
5	EDO	F	305	-	3,3,3	0.56	0	2,2,2	0.51	0
5	EDO	D	309	-	3,3,3	0.32	0	2,2,2	0.79	0
7	PEG	F	312	-	6,6,6	0.63	0	5,5,5	1.00	0
2	LYS	C	301	-	8,9,9	0.94	1 (12%)	7,10,10	1.04	0
4	ACT	B	305	-	3,3,3	1.27	0	3,3,3	1.55	0
4	ACT	C	304	-	3,3,3	1.45	1 (33%)	3,3,3	1.38	0
5	EDO	C	309	-	3,3,3	0.34	0	2,2,2	0.14	0
4	ACT	D	303	-	3,3,3	1.05	0	3,3,3	1.54	0
5	EDO	A	312	-	3,3,3	0.39	0	2,2,2	0.54	0
7	PEG	C	312	-	6,6,6	0.58	0	5,5,5	0.62	0
4	ACT	A	310	-	3,3,3	1.54	1 (33%)	3,3,3	1.27	0
5	EDO	B	308	-	3,3,3	0.73	0	2,2,2	0.48	0
2	LYS	B	301	-	8,9,9	0.86	0	7,10,10	0.98	0
6	PGE	F	310	-	9,9,9	0.35	0	8,8,8	0.33	0
5	EDO	D	311	-	3,3,3	0.39	0	2,2,2	0.56	0
4	ACT	C	303	-	3,3,3	1.13	0	3,3,3	1.42	0
6	PGE	A	315	-	9,9,9	0.41	0	8,8,8	0.67	0
5	EDO	A	314	-	3,3,3	0.52	0	2,2,2	0.29	0
6	PGE	B	310	-	9,9,9	0.28	0	8,8,8	0.26	0
5	EDO	D	312	-	3,3,3	0.24	0	2,2,2	0.50	0
6	PGE	D	315	-	9,9,9	0.47	0	8,8,8	0.71	0
7	PEG	C	316	-	6,6,6	0.49	0	5,5,5	0.41	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
6	PGE	D	313	-	9,9,9	0.31	0	8,8,8	0.47	0
6	PGE	E	311	-	9,9,9	0.35	0	8,8,8	0.94	0
7	PEG	C	317	-	6,6,6	0.44	0	5,5,5	0.77	0
7	PEG	F	313	-	6,6,6	0.50	0	5,5,5	0.46	0
8	GOL	B	312	-	5,5,5	1.83	1 (20%)	5,5,5	1.40	1 (20%)
7	PEG	C	314	-	6,6,6	0.53	0	5,5,5	0.34	0
4	ACT	A	308	-	3,3,3	1.38	1 (33%)	3,3,3	1.29	0
2	LYS	A	301	-	8,9,9	1.16	1 (12%)	7,10,10	1.10	1 (14%)
5	EDO	D	307	-	3,3,3	0.36	0	2,2,2	0.39	0
6	PGE	C	310	-	9,9,9	0.33	0	8,8,8	0.46	0
5	EDO	A	313	-	3,3,3	0.29	0	2,2,2	0.61	0
7	PEG	A	317	-	6,6,6	0.69	0	5,5,5	0.82	0
4	ACT	E	306	-	3,3,3	1.34	0	3,3,3	1.48	0
4	ACT	C	305	-	3,3,3	1.77	1 (33%)	3,3,3	1.05	0
2	LYS	E	301	-	8,9,9	0.57	0	7,10,10	0.81	0
7	PEG	D	316	-	6,6,6	0.53	0	5,5,5	0.32	0
6	PGE	A	316	-	9,9,9	0.37	0	8,8,8	0.48	0
7	PEG	B	311	-	6,6,6	0.41	0	5,5,5	0.56	0
5	EDO	C	308	-	3,3,3	0.66	0	2,2,2	0.71	0
2	LYS	F	301	-	8,9,9	0.77	0	7,10,10	1.15	1 (14%)
5	EDO	F	307	-	3,3,3	1.01	0	2,2,2	1.02	0
5	EDO	D	306	-	3,3,3	0.65	0	2,2,2	0.22	0
5	EDO	F	309	-	3,3,3	0.44	0	2,2,2	0.10	0
5	EDO	C	307	-	3,3,3	0.31	0	2,2,2	0.75	0
5	EDO	B	307	-	3,3,3	0.44	0	2,2,2	0.54	0
5	EDO	B	306	-	3,3,3	0.35	0	2,2,2	0.32	0
4	ACT	F	303	-	3,3,3	1.46	1 (33%)	3,3,3	1.25	0
5	EDO	C	306	-	3,3,3	0.55	0	2,2,2	0.57	0
6	PGE	C	311	-	9,9,9	0.76	0	8,8,8	1.59	2 (25%)
5	EDO	E	309	-	3,3,3	0.52	0	2,2,2	0.55	0
6	PGE	D	314	-	9,9,9	0.37	0	8,8,8	0.52	0
4	ACT	D	305	-	3,3,3	1.69	1 (33%)	3,3,3	1.45	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. <sup>1,2</sup> means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
7	PEG	F	311	-	-	1/4/4/4	-
5	EDO	D	308	-	-	0/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	LYS	D	301	-	-	1/9/9/9	-
5	EDO	D	310	-	-	1/1/1/1	-
8	GOL	F	314	-	-	2/4/4/4	-
8	GOL	D	317	-	-	2/4/4/4	-
7	PEG	C	315	-	-	3/4/4/4	-
5	EDO	A	311	-	-	0/1/1/1	-
5	EDO	E	308	-	-	0/1/1/1	-
5	EDO	F	306	-	-	1/1/1/1	-
5	EDO	E	310	-	-	1/1/1/1	-
7	PEG	C	313	-	-	3/4/4/4	-
5	EDO	B	309	-	-	0/1/1/1	-
5	EDO	E	307	-	-	1/1/1/1	-
5	EDO	F	308	-	-	0/1/1/1	-
5	EDO	F	305	-	-	1/1/1/1	-
5	EDO	D	309	-	-	1/1/1/1	-
7	PEG	F	312	-	-	2/4/4/4	-
2	LYS	C	301	-	-	1/9/9/9	-
5	EDO	C	309	-	-	1/1/1/1	-
5	EDO	A	312	-	-	0/1/1/1	-
7	PEG	C	312	-	-	4/4/4/4	-
5	EDO	B	308	-	-	0/1/1/1	-
2	LYS	B	301	-	-	2/9/9/9	-
6	PGE	F	310	-	-	5/7/7/7	-
5	EDO	D	311	-	-	0/1/1/1	-
7	PEG	C	316	-	-	3/4/4/4	-
6	PGE	A	315	-	-	1/7/7/7	-
5	EDO	A	314	-	-	1/1/1/1	-
6	PGE	B	310	-	-	1/7/7/7	-
5	EDO	D	312	-	-	0/1/1/1	-
6	PGE	D	315	-	-	1/7/7/7	-
7	PEG	C	317	-	-	2/4/4/4	-
6	PGE	D	313	-	-	1/7/7/7	-
6	PGE	E	311	-	-	4/7/7/7	-
7	PEG	F	313	-	-	3/4/4/4	-
8	GOL	B	312	-	-	4/4/4/4	-
7	PEG	C	314	-	-	0/4/4/4	-
2	LYS	A	301	-	-	1/9/9/9	-
5	EDO	D	307	-	-	0/1/1/1	-
6	PGE	C	310	-	-	2/7/7/7	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	EDO	A	313	-	-	0/1/1/1	-
7	PEG	A	317	-	-	3/4/4/4	-
2	LYS	E	301	-	-	1/9/9/9	-
7	PEG	D	316	-	-	2/4/4/4	-
6	PGE	A	316	-	-	4/7/7/7	-
7	PEG	B	311	-	-	1/4/4/4	-
5	EDO	C	308	-	-	1/1/1/1	-
2	LYS	F	301	-	-	1/9/9/9	-
5	EDO	F	307	-	-	1/1/1/1	-
5	EDO	D	306	-	-	0/1/1/1	-
5	EDO	F	309	-	-	1/1/1/1	-
5	EDO	C	307	-	-	0/1/1/1	-
5	EDO	B	307	-	-	0/1/1/1	-
5	EDO	B	306	-	-	0/1/1/1	-
5	EDO	C	306	-	-	1/1/1/1	-
6	PGE	C	311	-	-	3/7/7/7	-
5	EDO	E	309	-	-	1/1/1/1	-
6	PGE	D	314	-	-	3/7/7/7	-

The worst 5 of 14 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	E	305	ACT	CH3-C	3.01	1.60	1.49
8	B	312	GOL	O3-C3	-2.92	1.30	1.42
4	D	305	ACT	CH3-C	2.74	1.59	1.49
2	A	301	LYS	OXT-C	-2.51	1.22	1.30
4	A	309	ACT	CH3-C	2.45	1.58	1.49

The worst 5 of 11 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	D	317	GOL	O2-C2-C3	3.54	123.85	109.18
6	C	311	PGE	C5-O3-C4	2.99	126.34	113.26
8	F	314	GOL	C3-C2-C1	-2.68	101.97	111.80
8	D	317	GOL	O2-C2-C1	2.64	120.11	109.18
2	F	301	LYS	OXT-C-O	-2.49	118.42	124.08

There are no chirality outliers.

5 of 80 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	301	LYS	C-CA-CB-CG
8	B	312	GOL	O1-C1-C2-C3
8	F	314	GOL	O1-C1-C2-C3
6	F	310	PGE	C1-C2-O2-C3
6	E	311	PGE	C3-C4-O3-C5

There are no ring outliers.

43 monomers are involved in 124 short contacts:

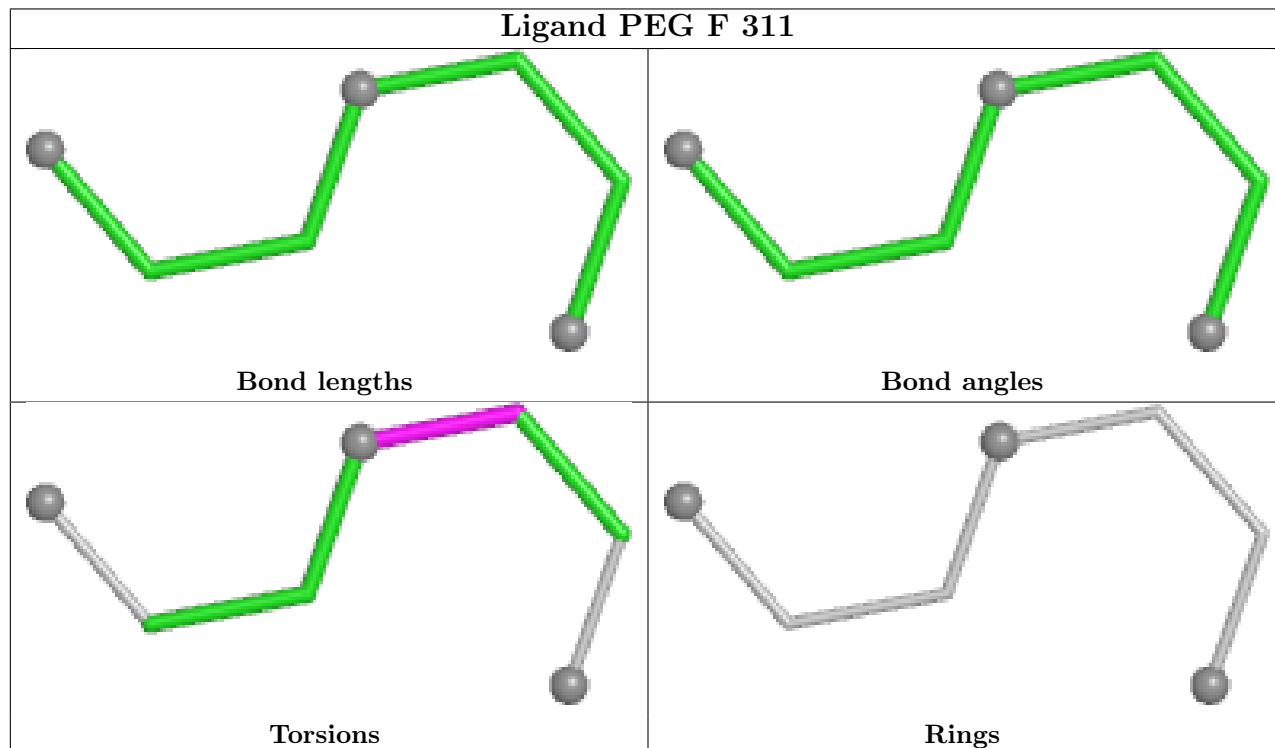
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	301	LYS	2	0
8	D	317	GOL	2	0
4	E	304	ACT	3	0
5	A	311	EDO	7	0
5	E	310	EDO	1	0
7	C	313	PEG	7	0
5	E	307	EDO	1	0
5	F	308	EDO	1	0
5	F	305	EDO	1	0
7	F	312	PEG	3	0
2	C	301	LYS	7	0
5	C	309	EDO	4	0
7	C	312	PEG	3	0
5	B	308	EDO	1	0
2	B	301	LYS	2	0
6	F	310	PGE	4	0
5	D	311	EDO	2	0
4	C	303	ACT	3	0
6	A	315	PGE	2	0
5	A	314	EDO	1	0
6	B	310	PGE	1	0
5	D	312	EDO	1	0
6	D	315	PGE	1	0
6	D	313	PGE	1	0
6	E	311	PGE	5	0
7	C	317	PEG	6	0
7	F	313	PEG	2	0
8	B	312	GOL	6	0
7	C	314	PEG	1	0
6	C	310	PGE	4	0
5	A	313	EDO	3	0
7	A	317	PEG	2	0
2	E	301	LYS	3	0

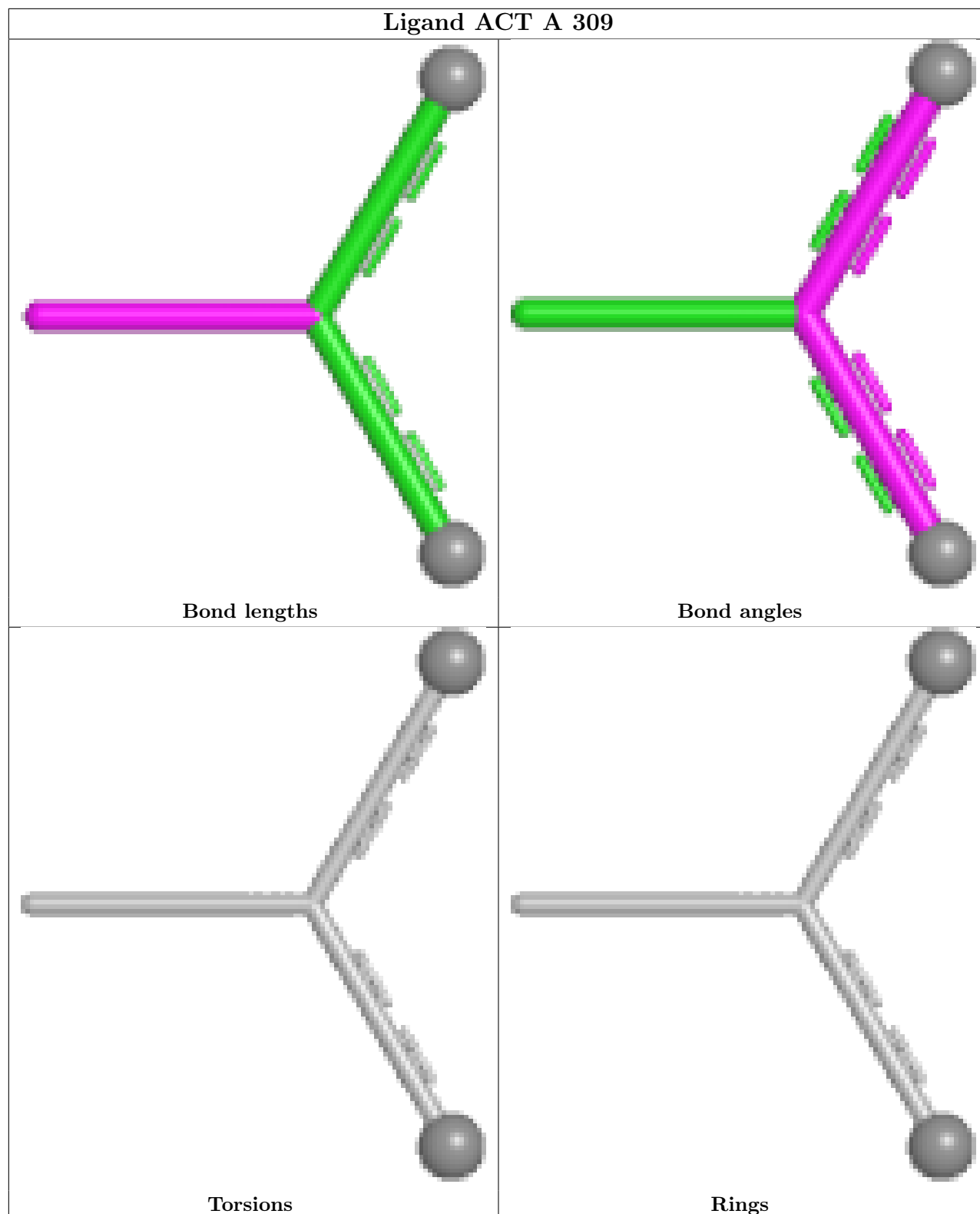
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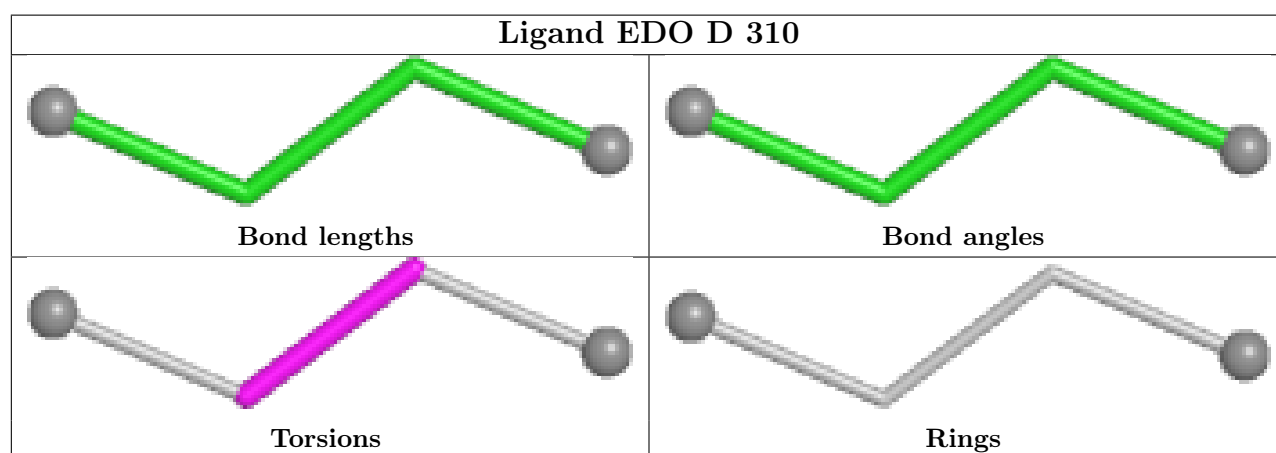
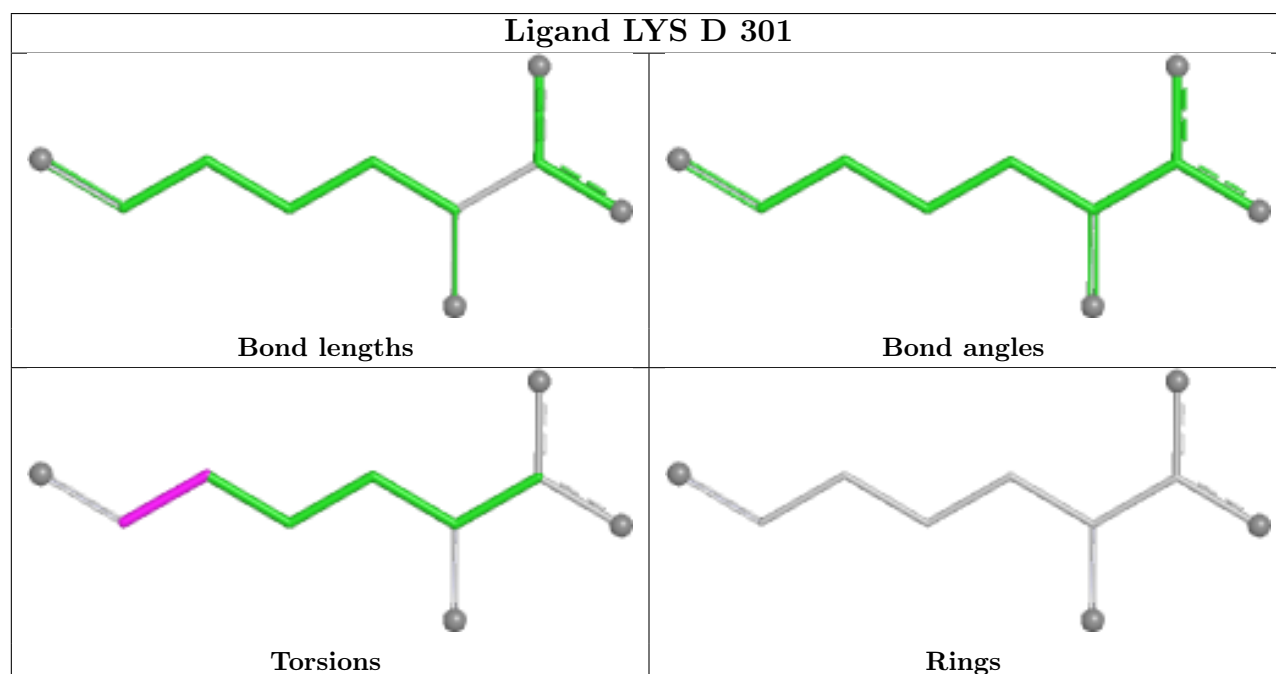
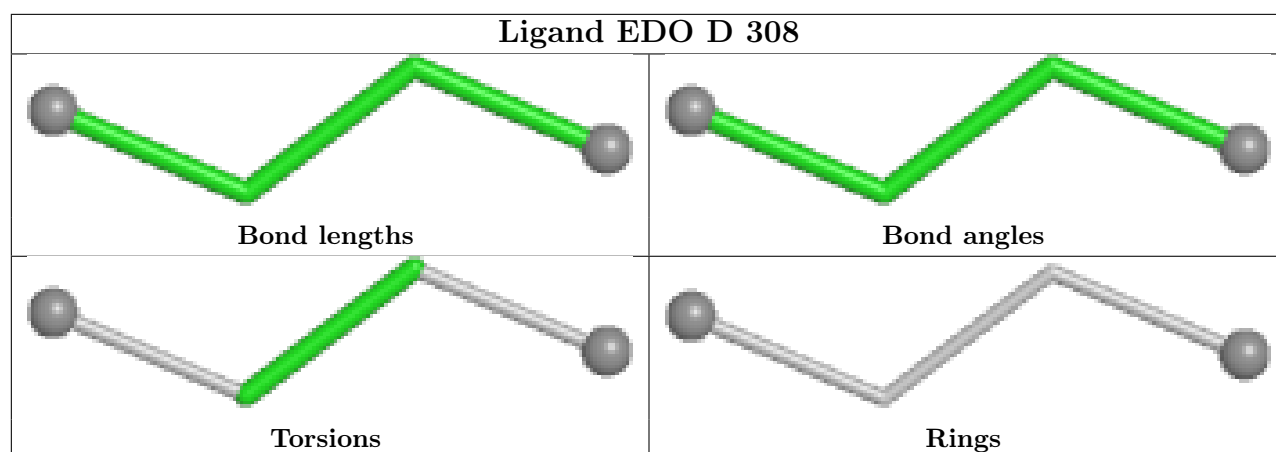
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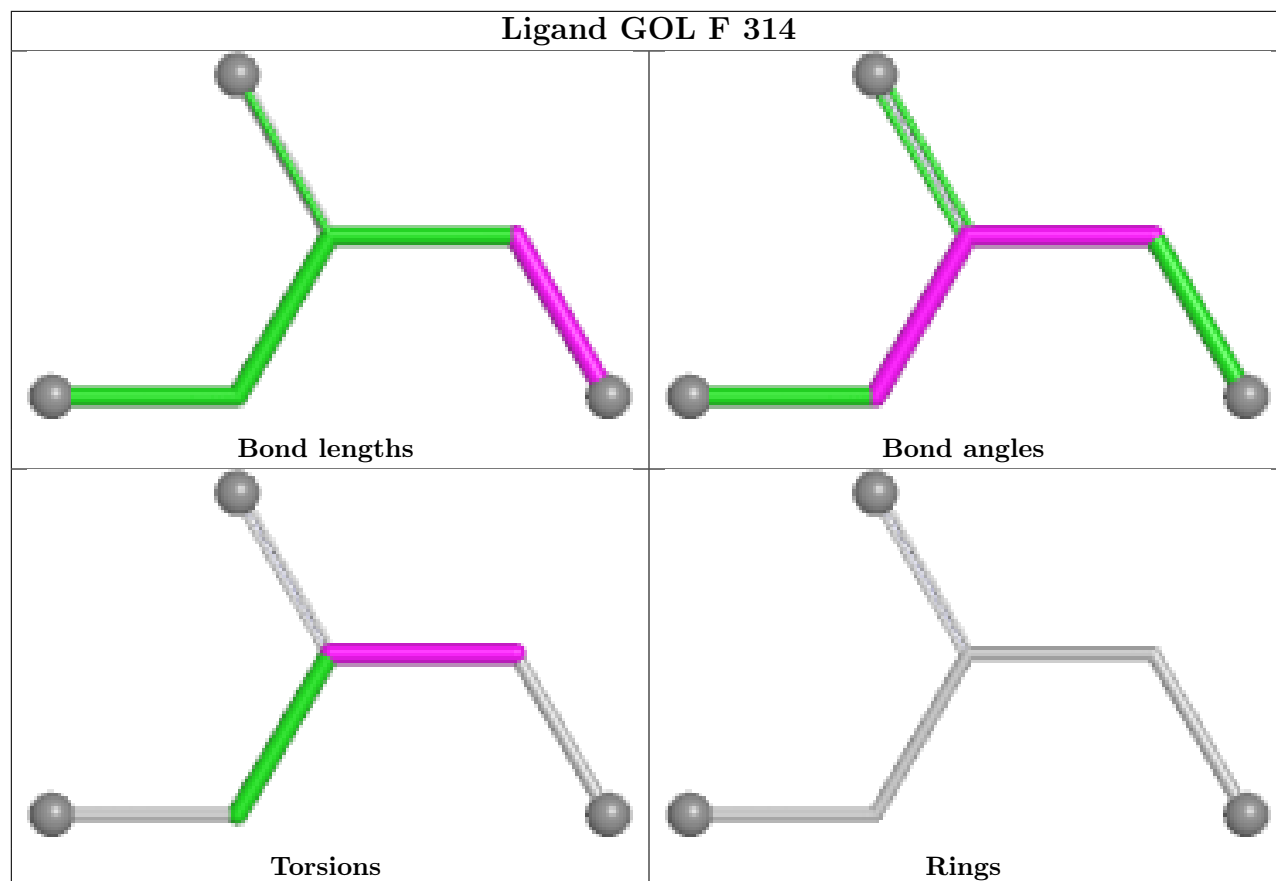
Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	D	316	PEG	6	0
7	B	311	PEG	2	0
5	C	308	EDO	4	0
2	F	301	LYS	1	0
5	F	307	EDO	9	0
5	C	307	EDO	2	0
5	B	306	EDO	1	0
5	C	306	EDO	1	0
6	C	311	PGE	18	0
6	D	314	PGE	1	0

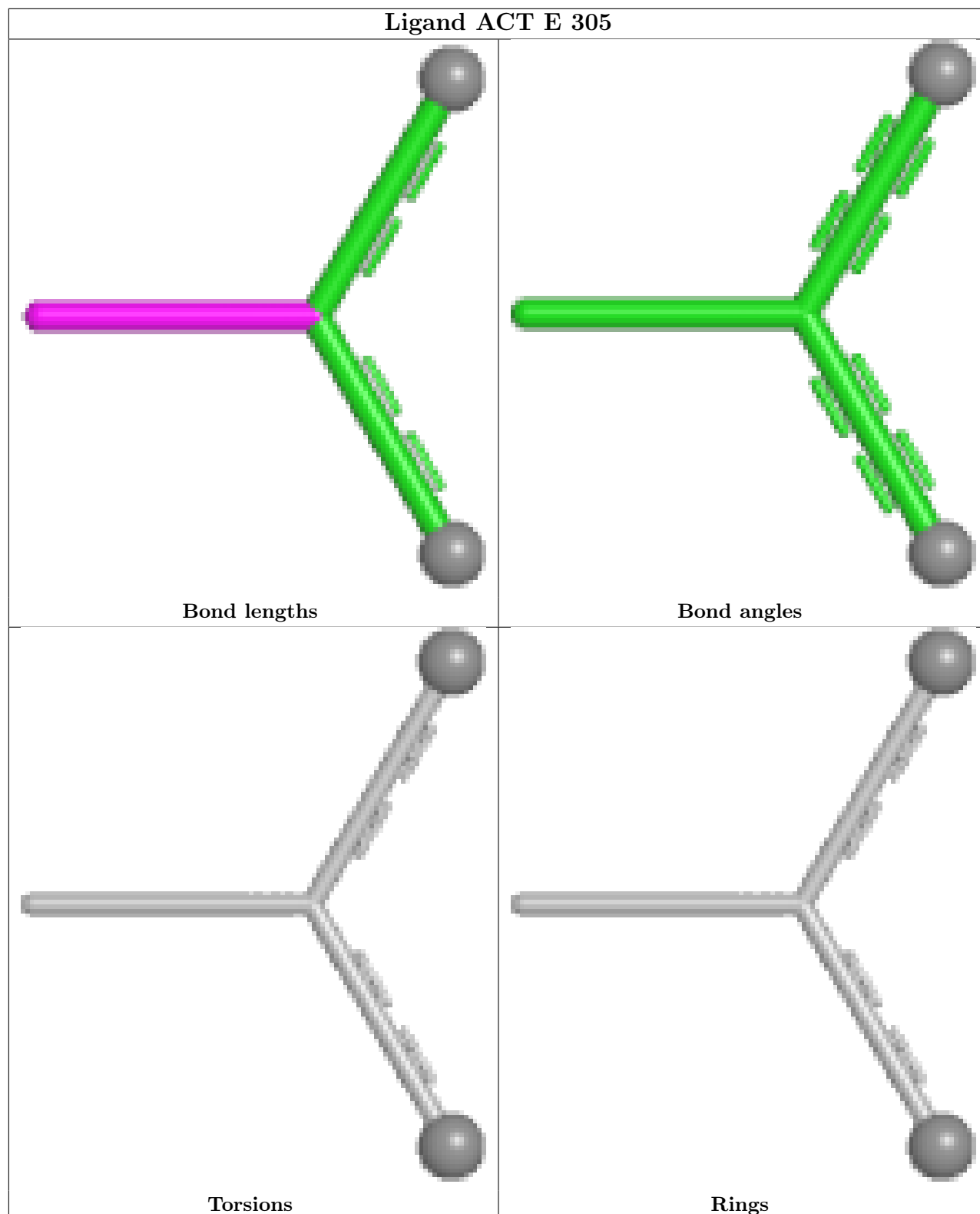
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

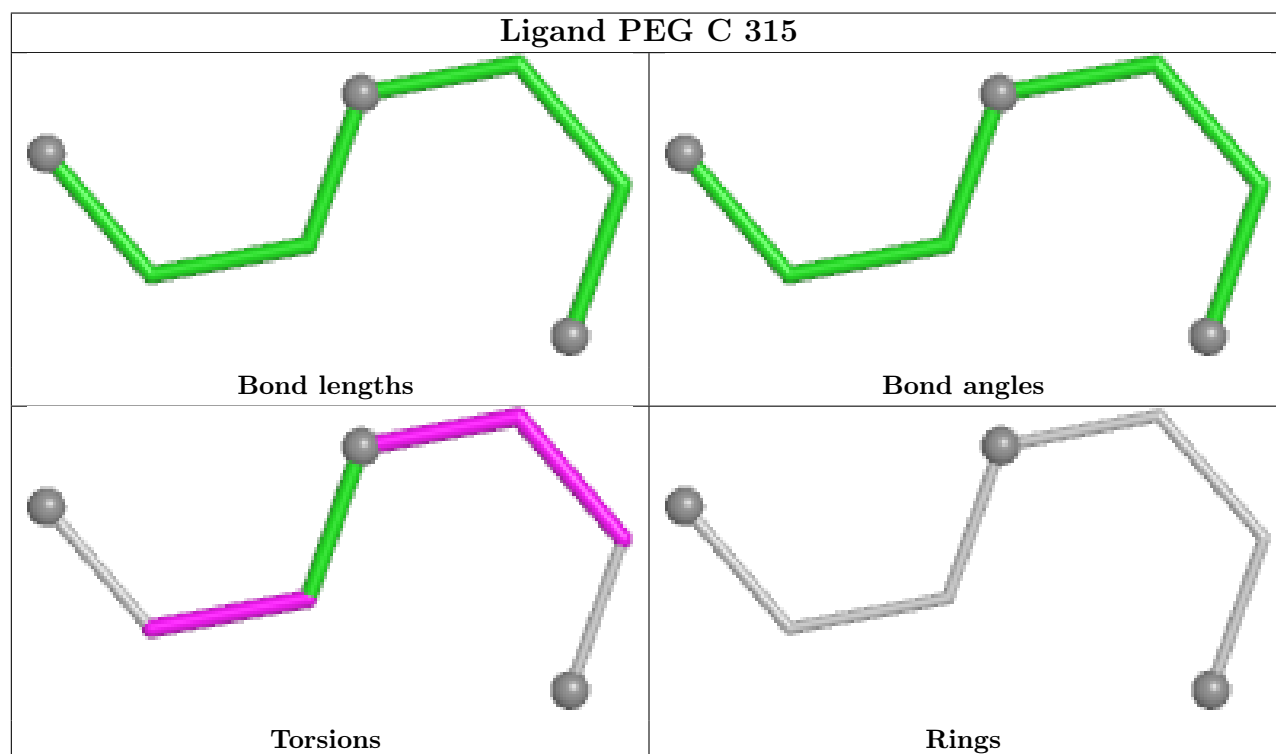
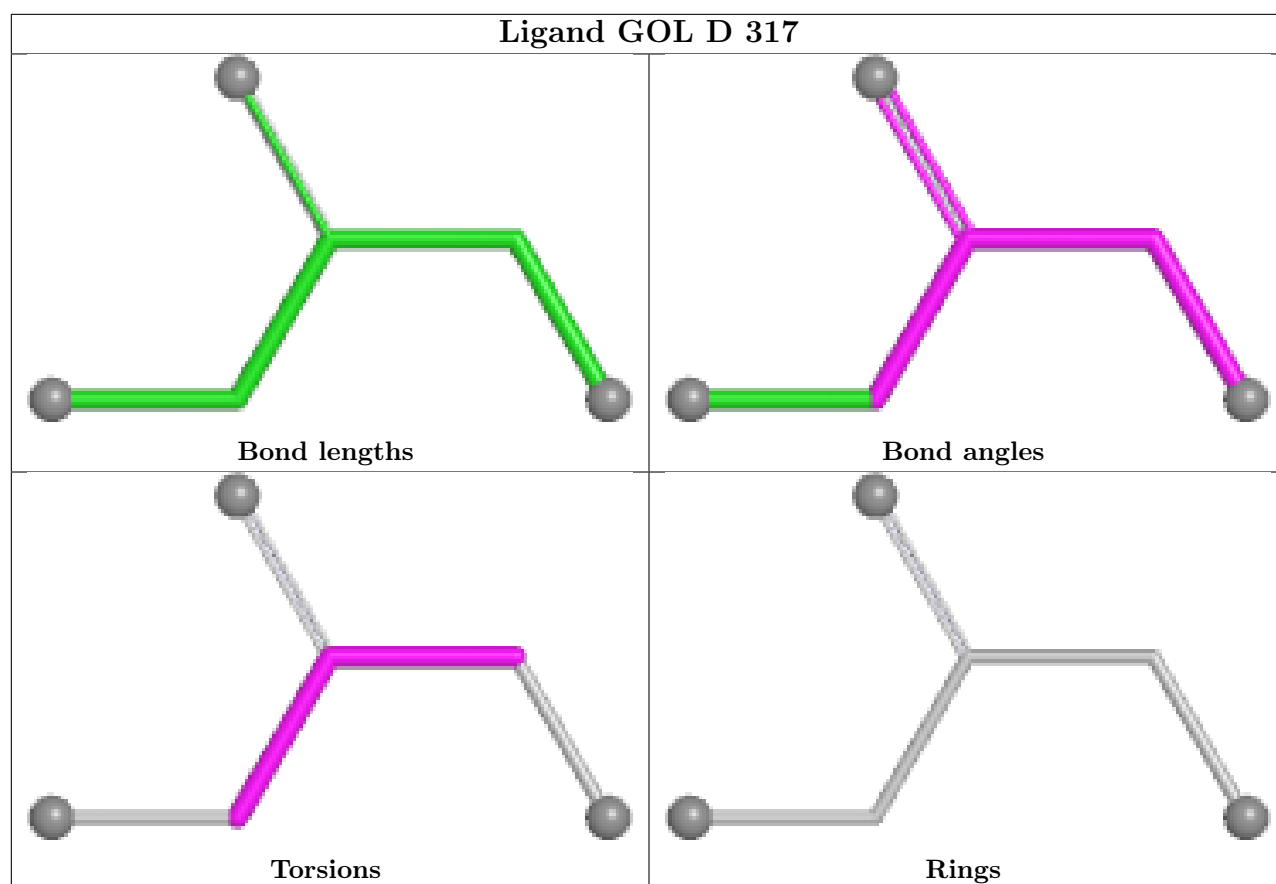


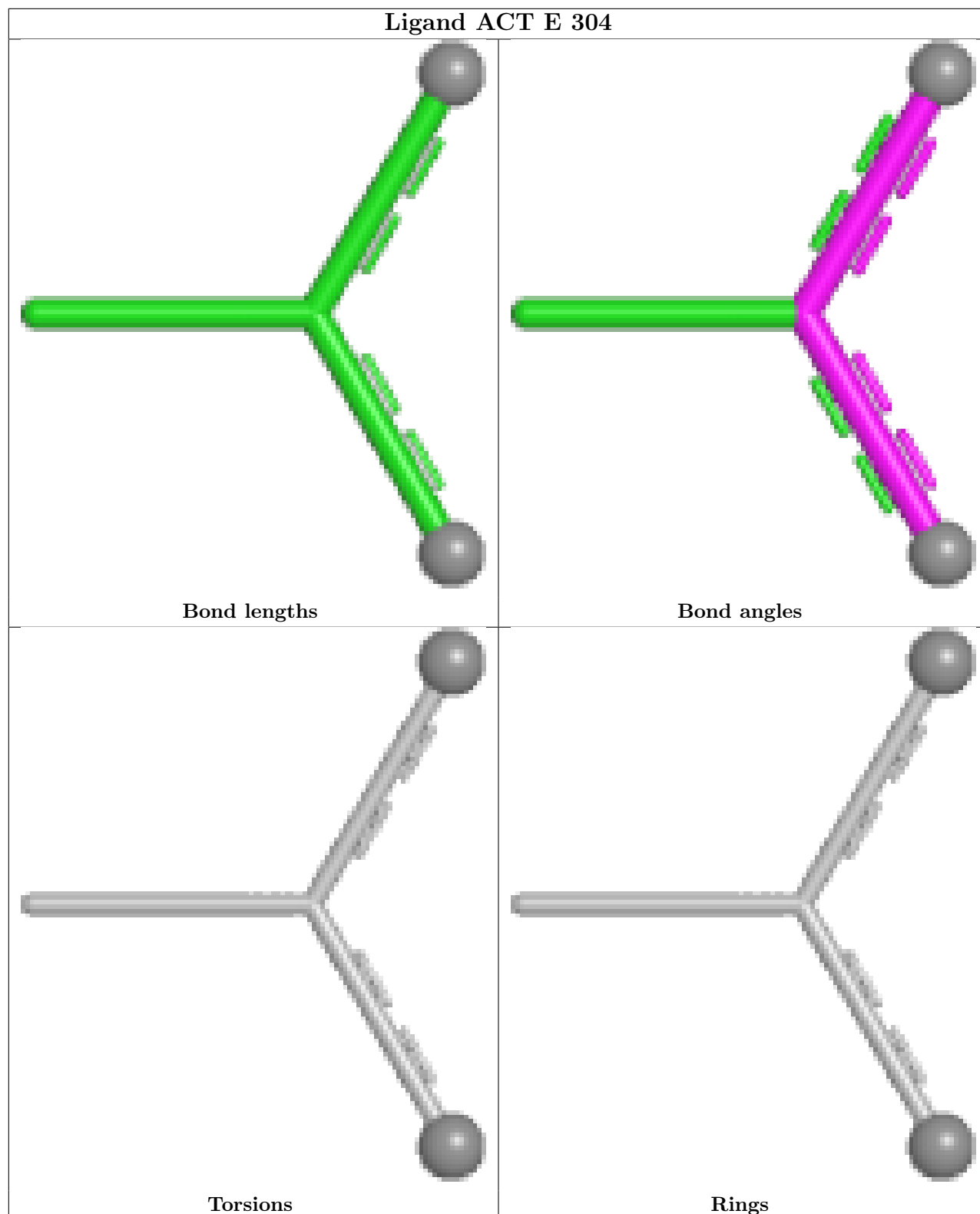


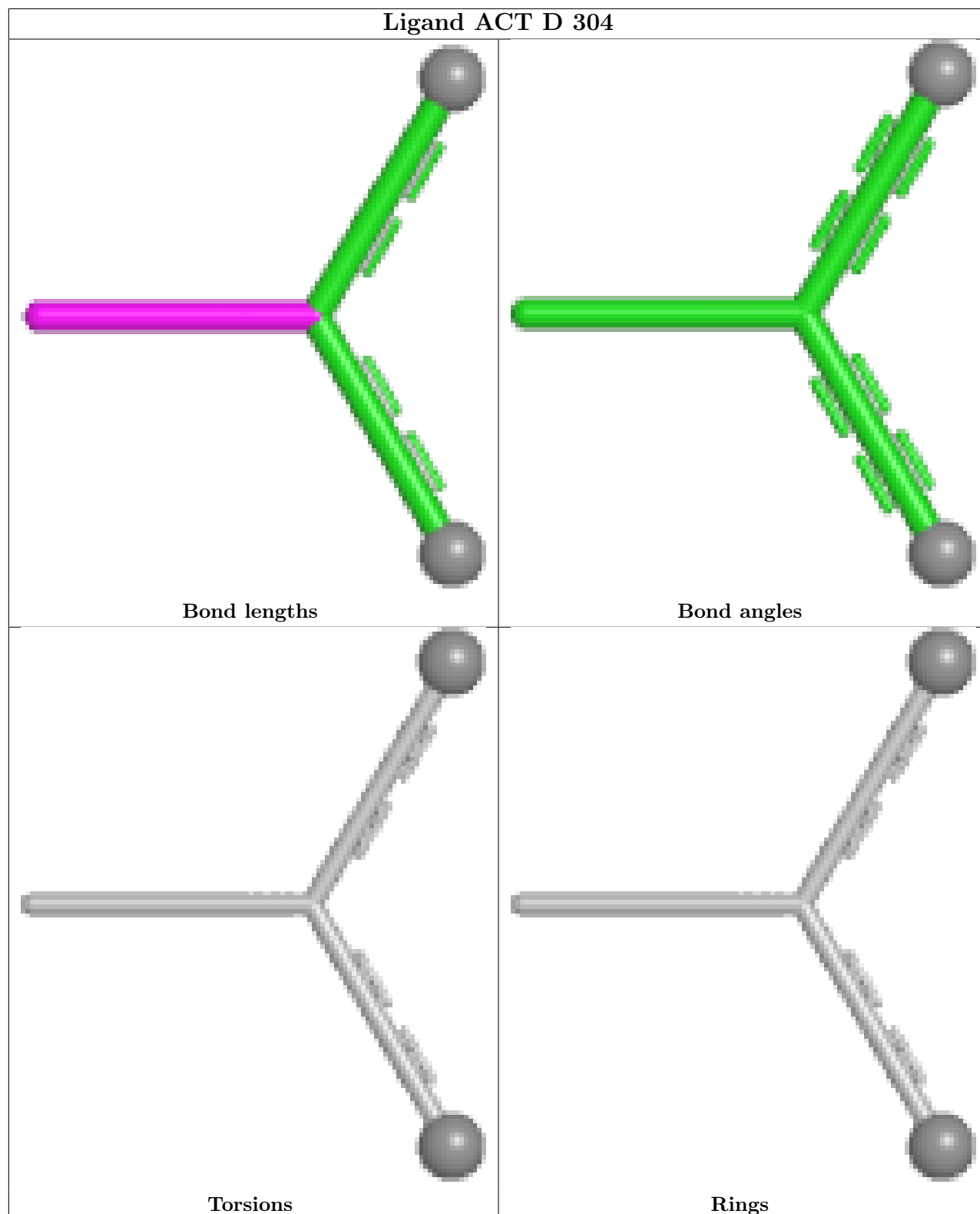


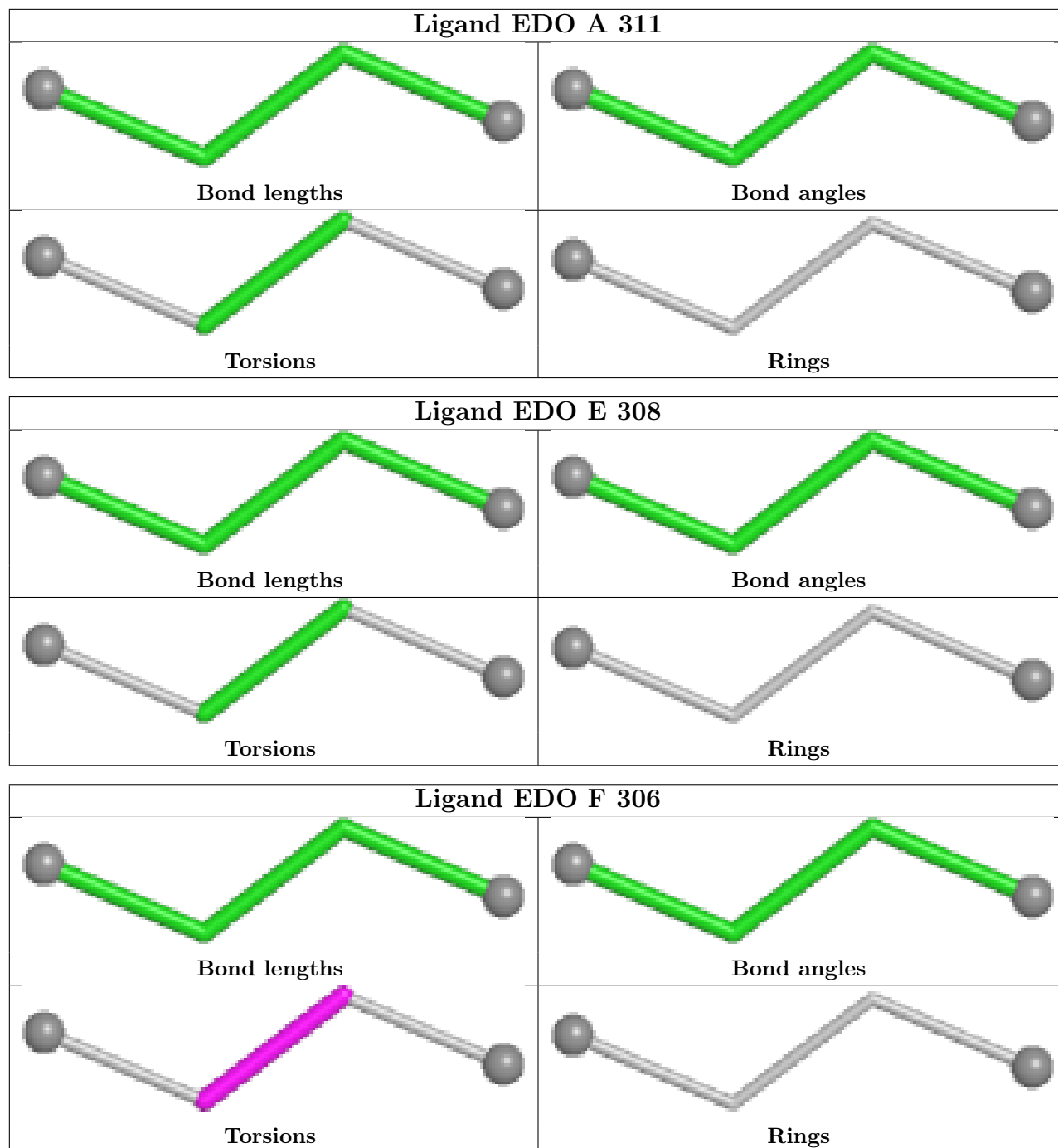


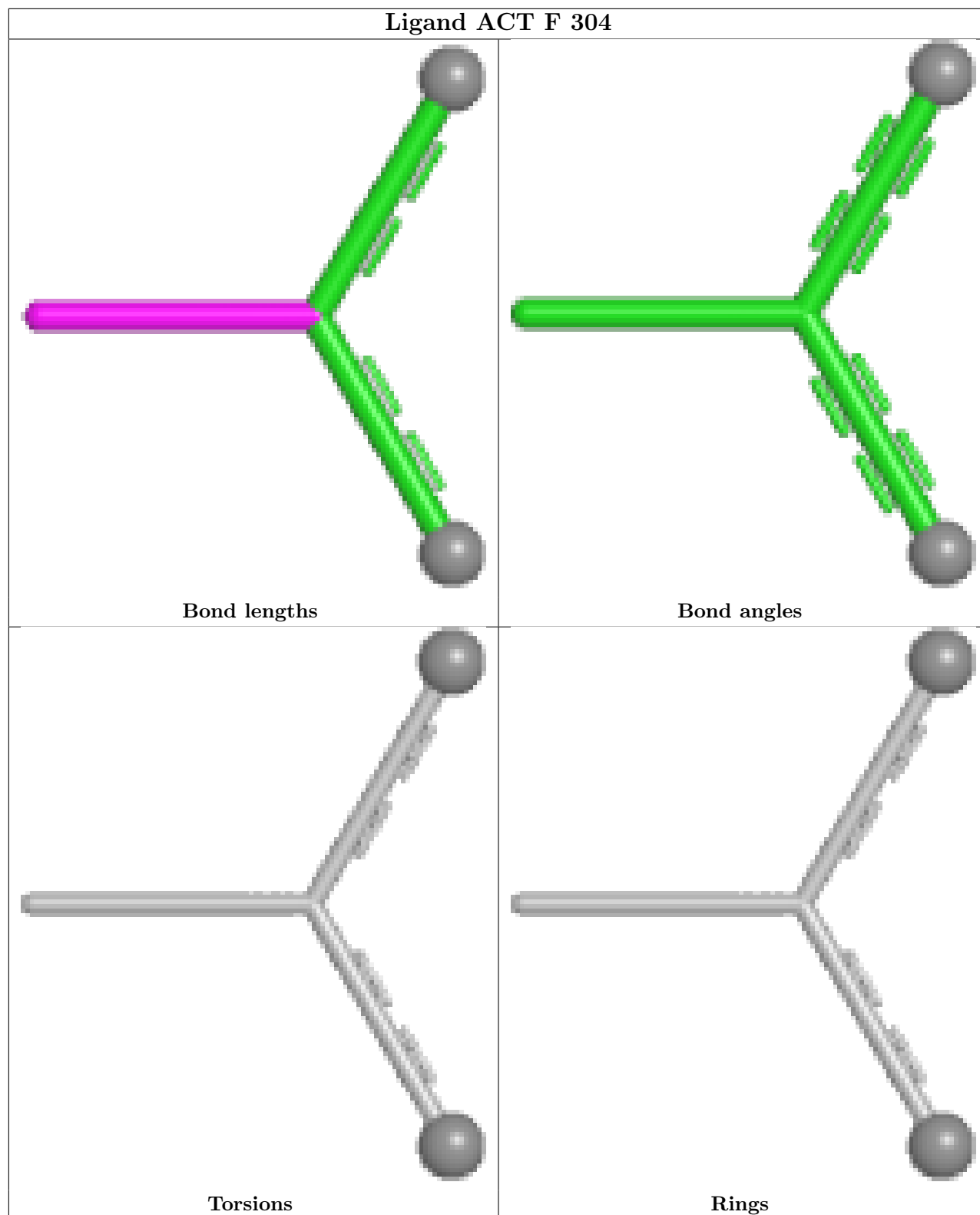


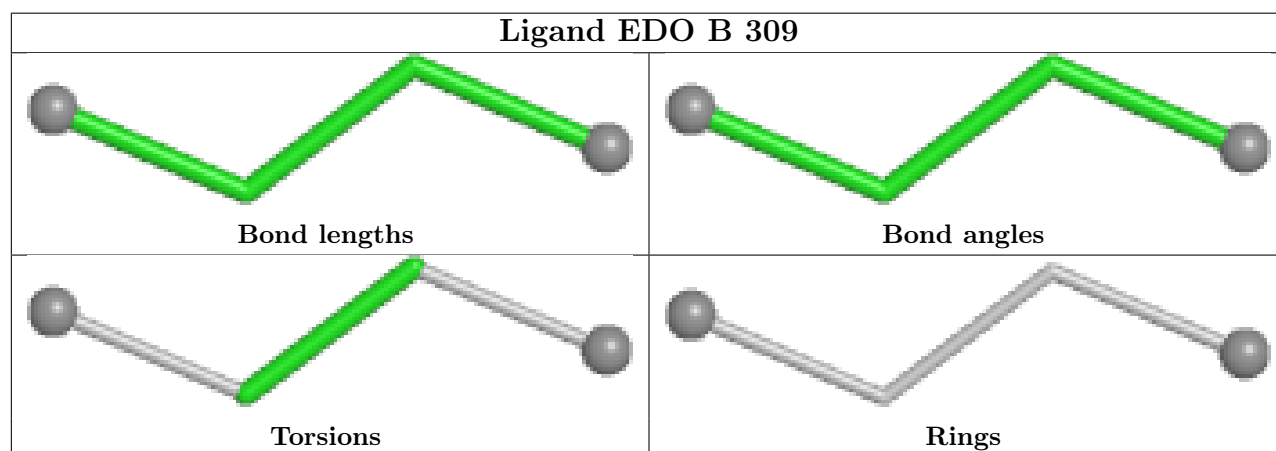
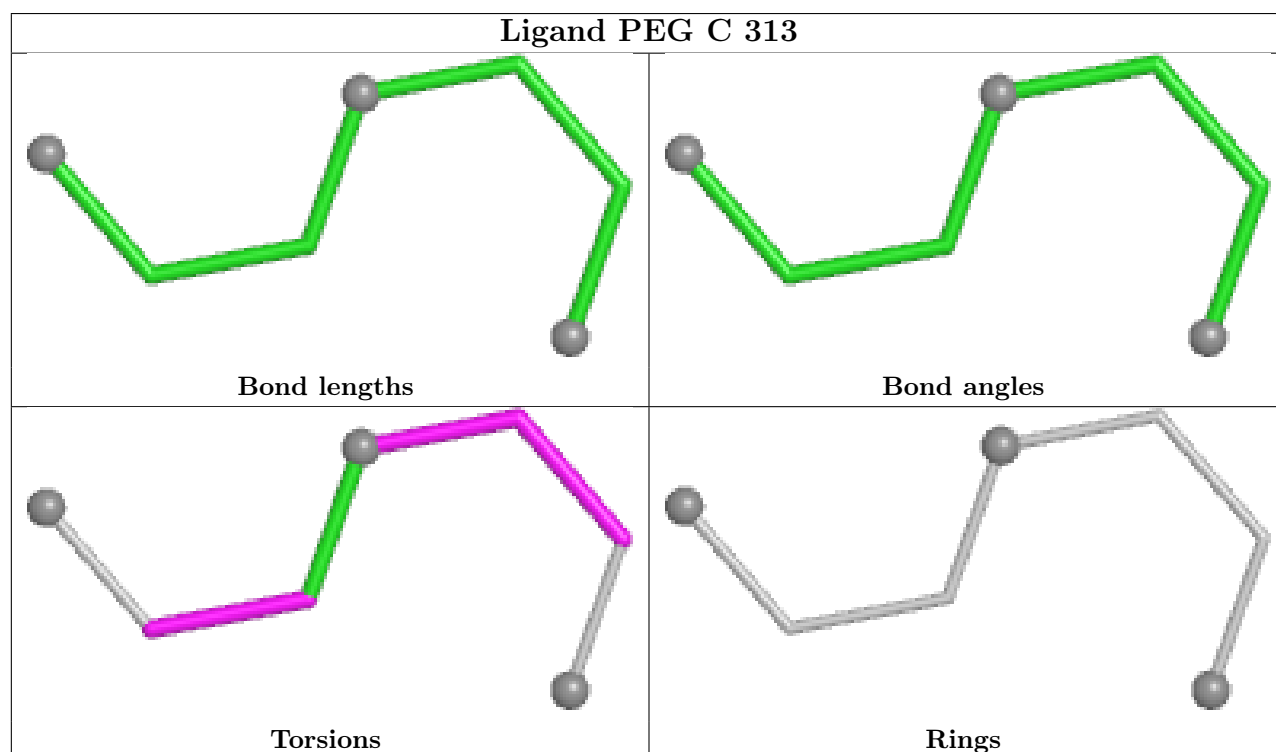
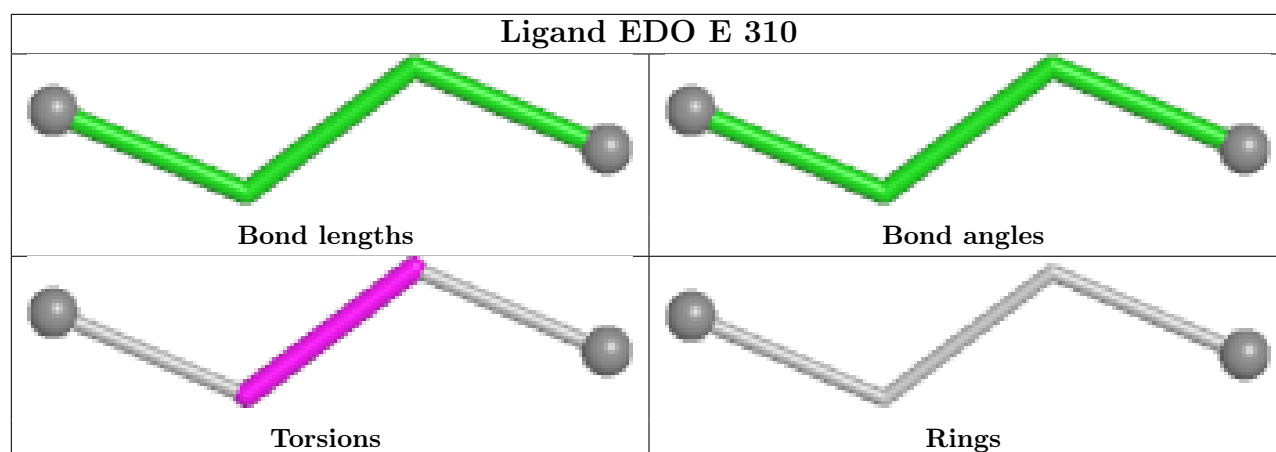


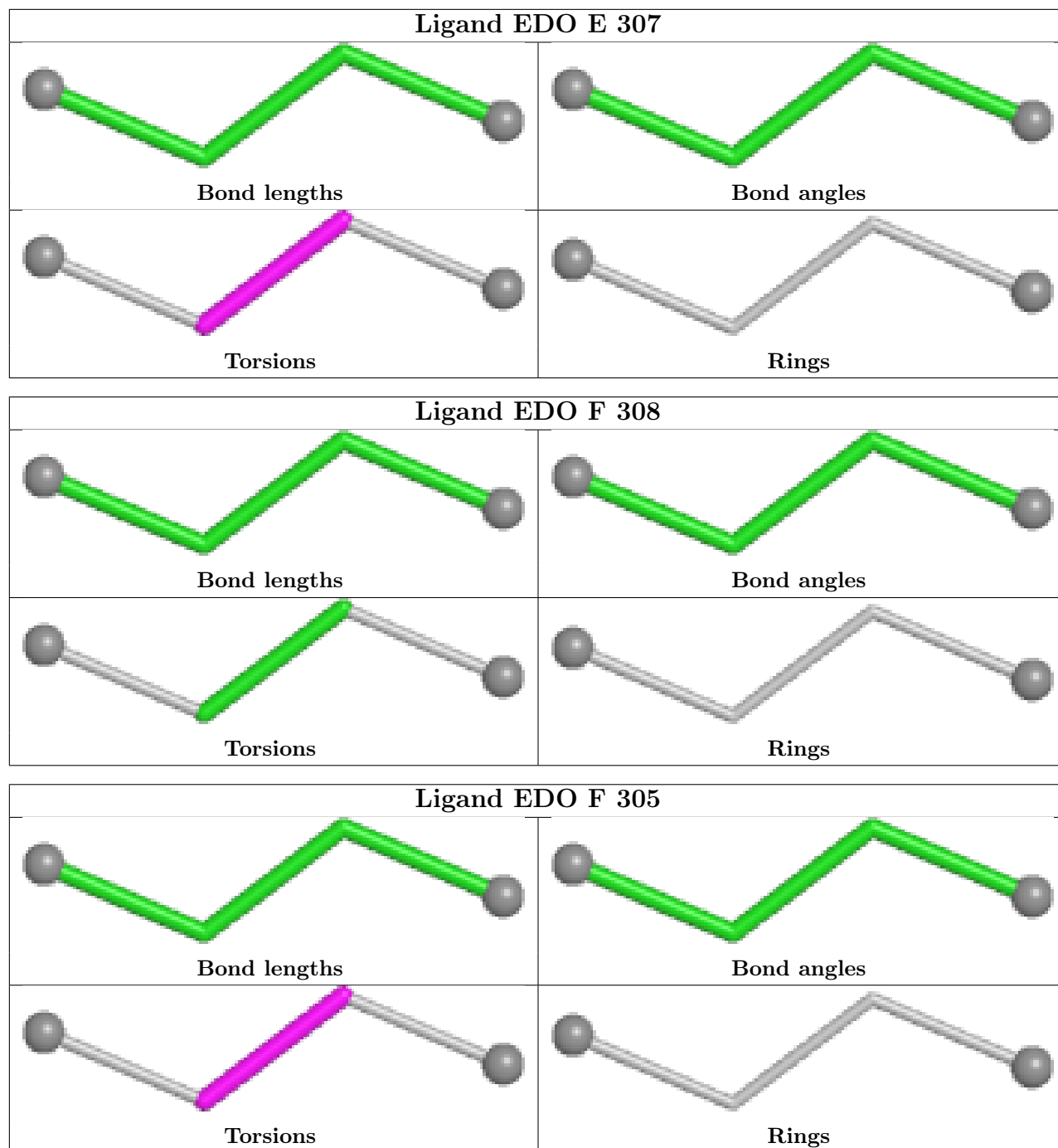


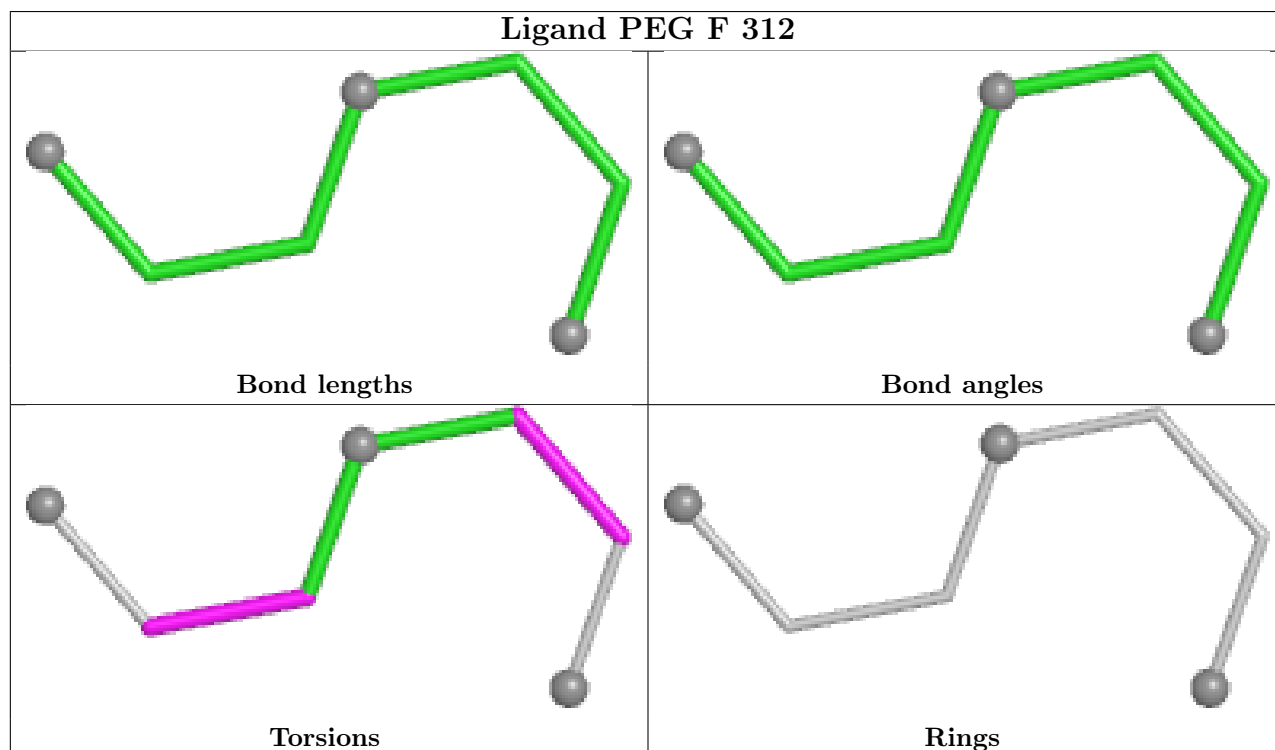
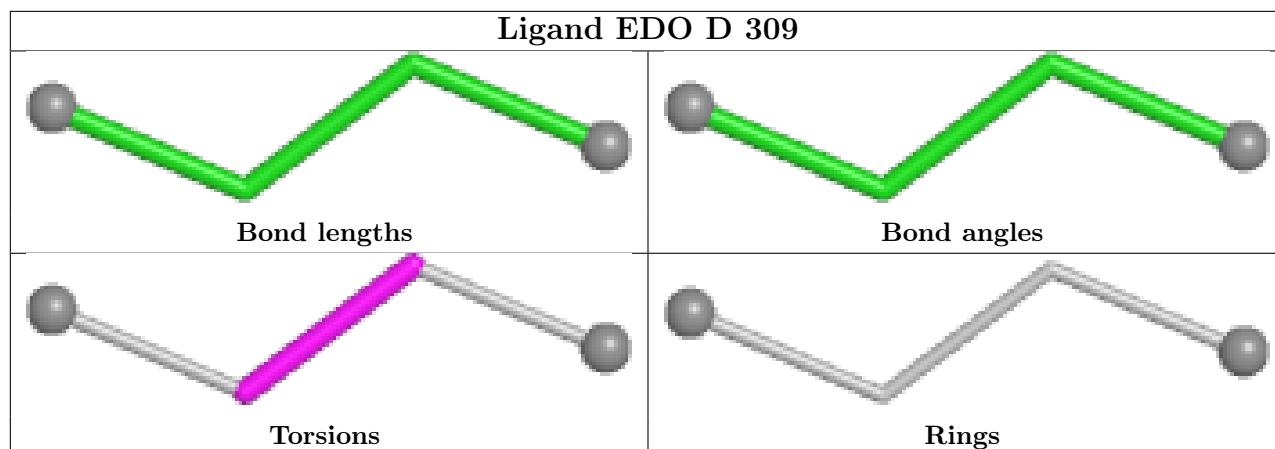


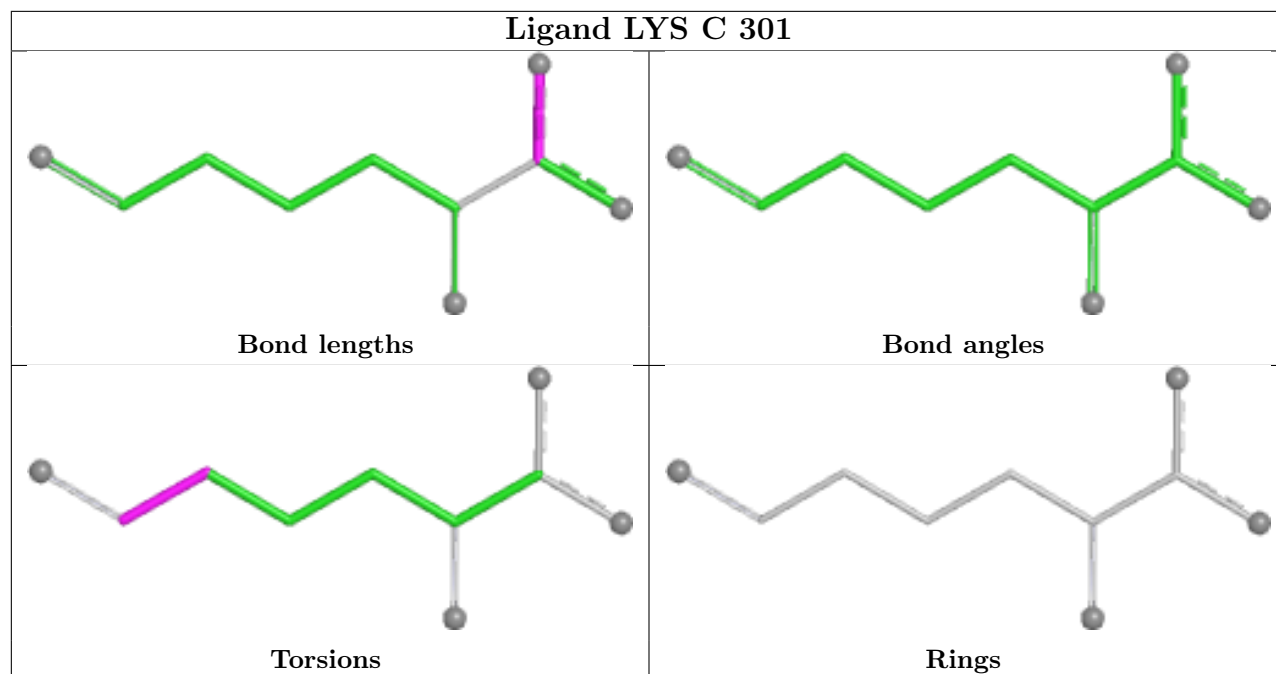


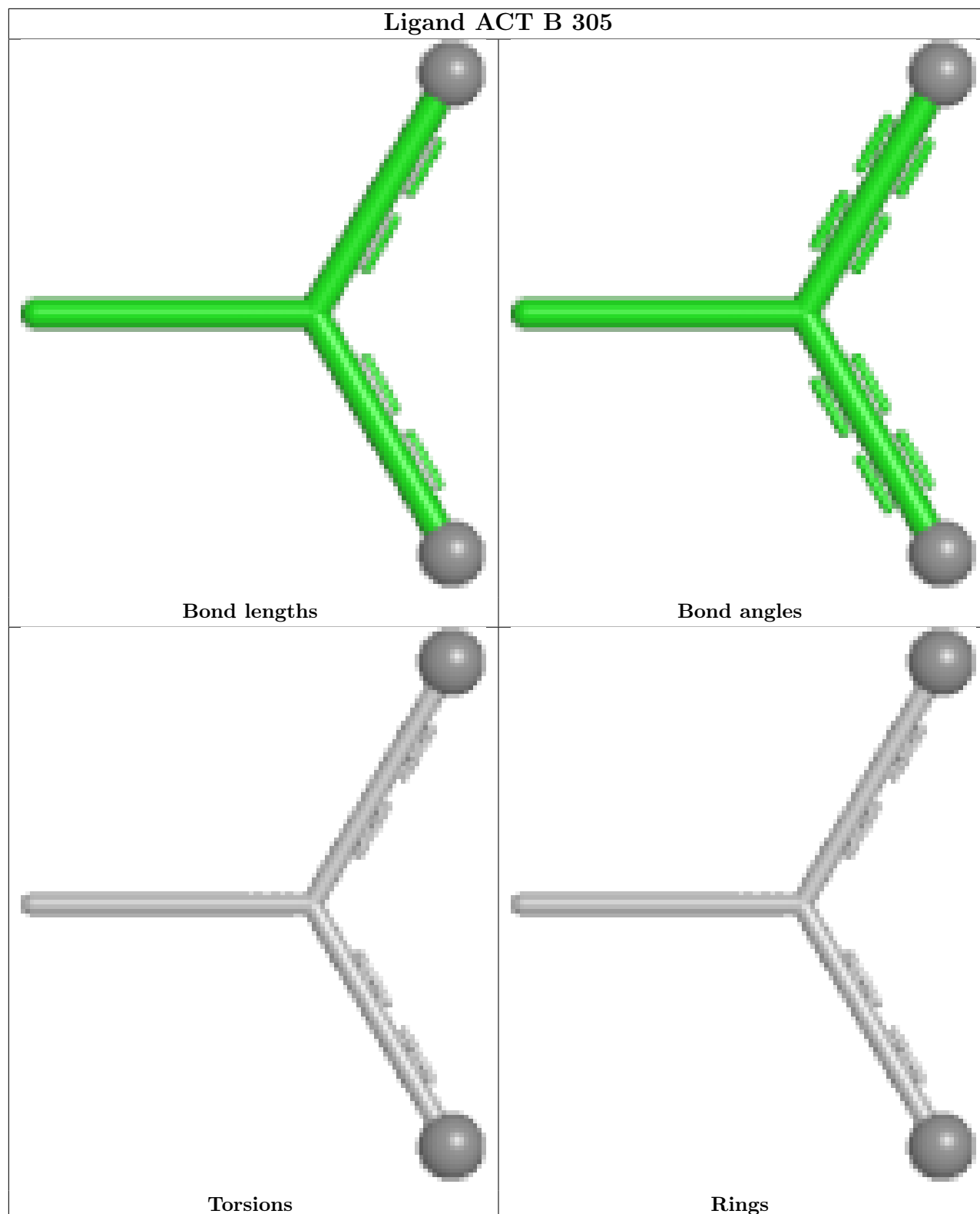


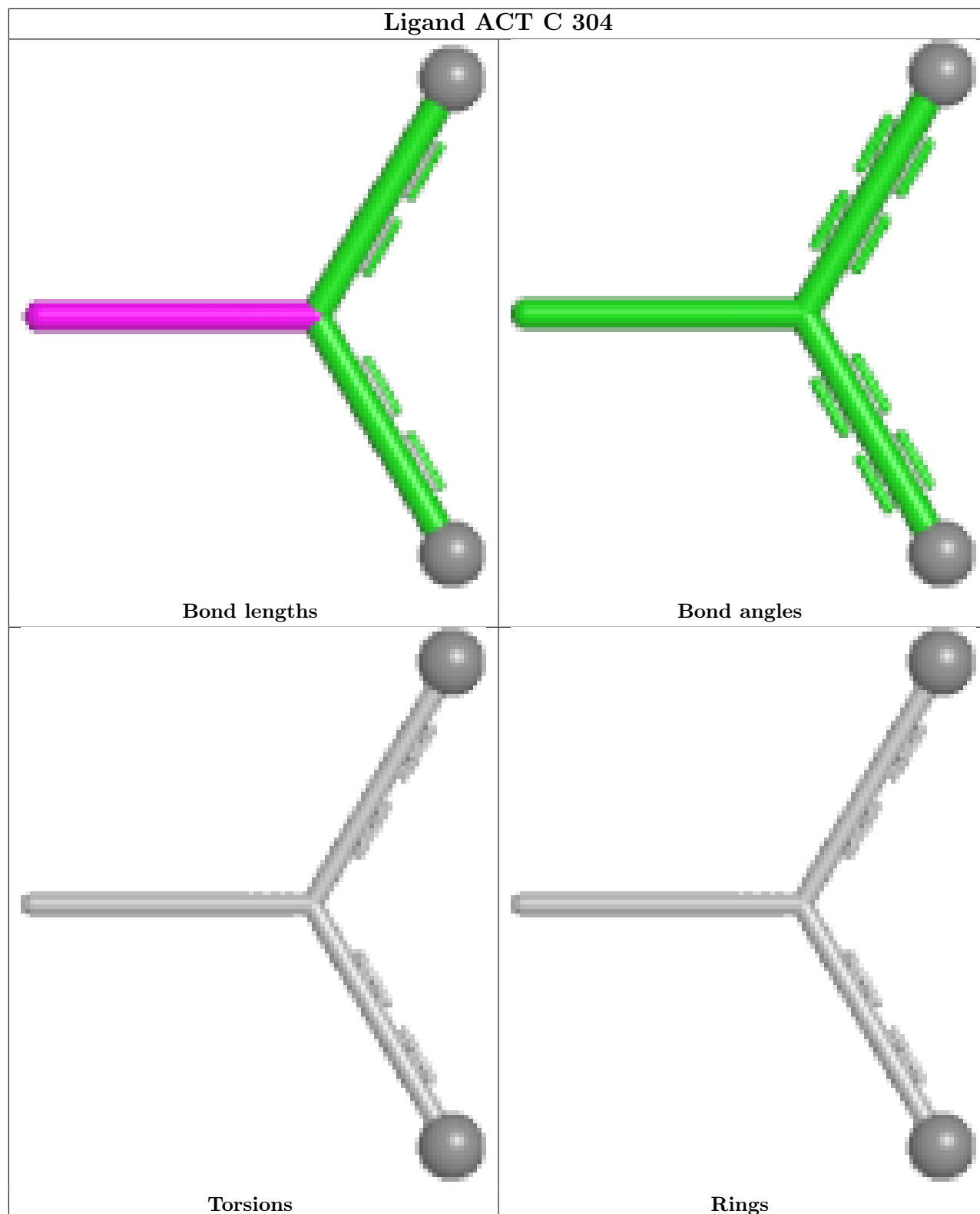


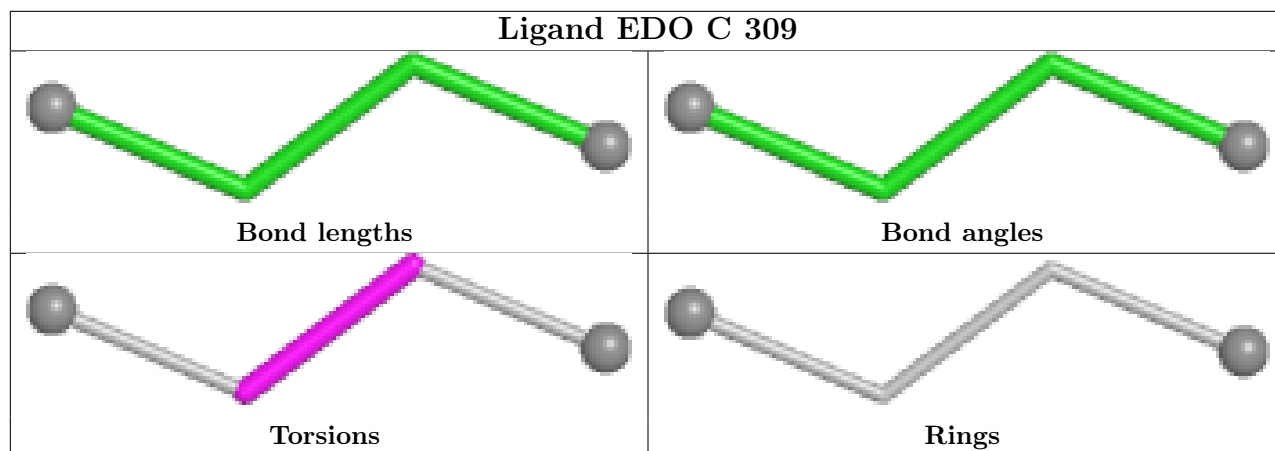


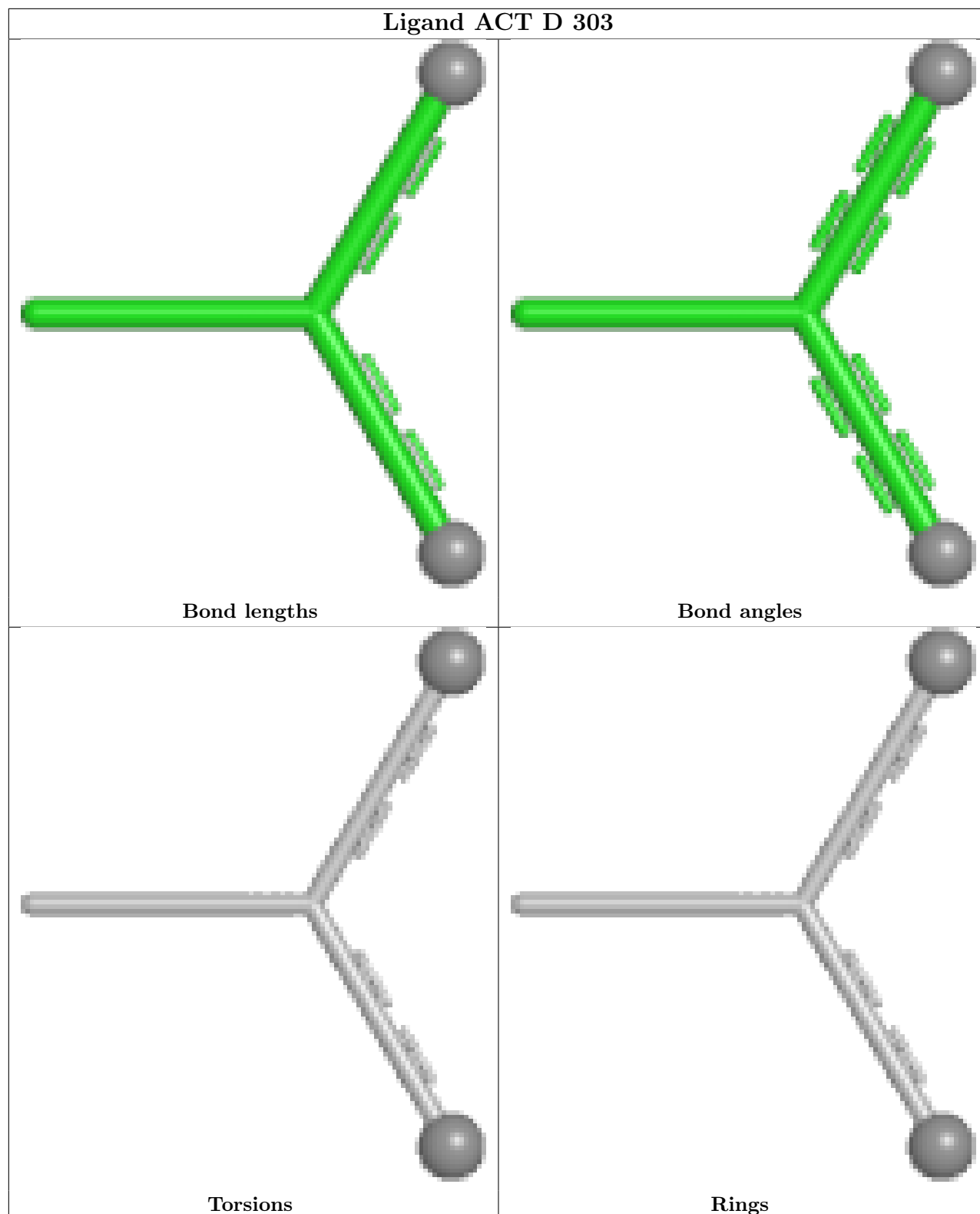


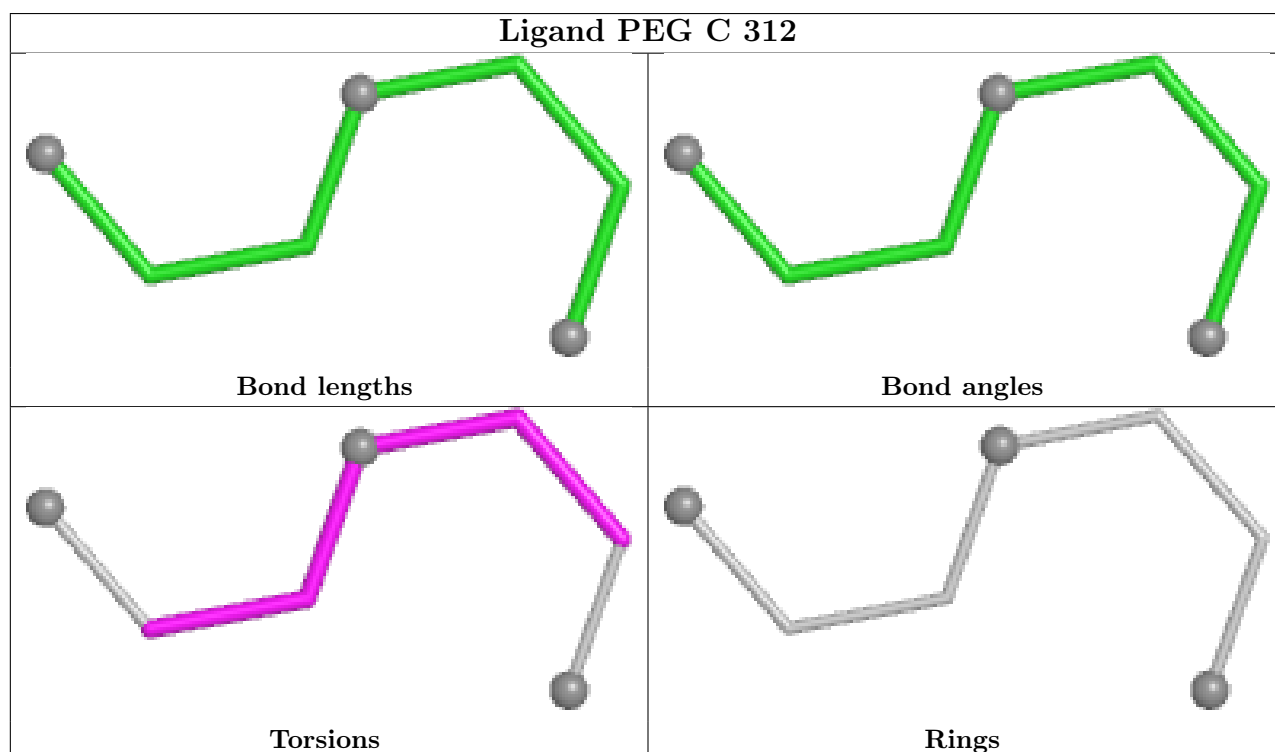
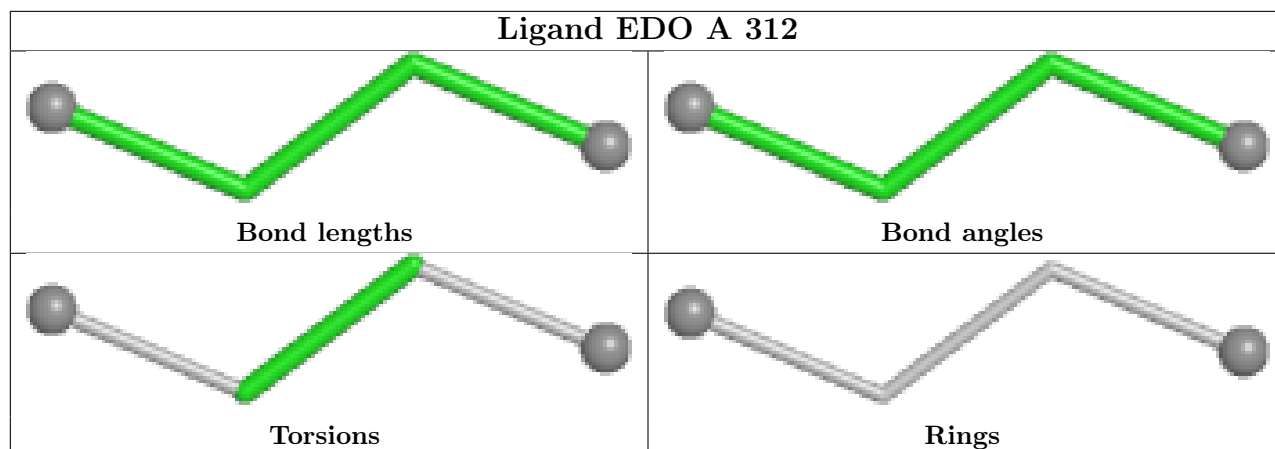


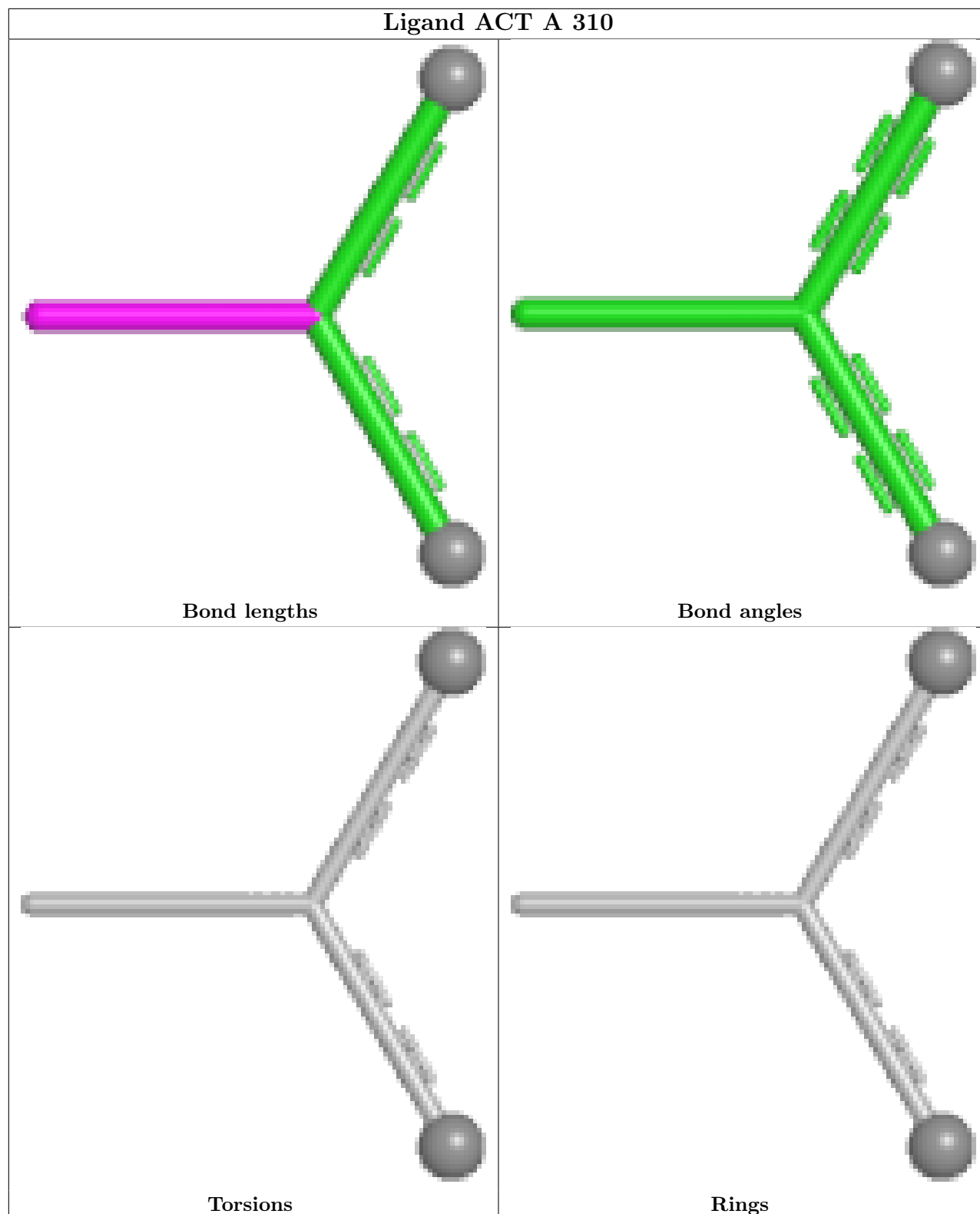


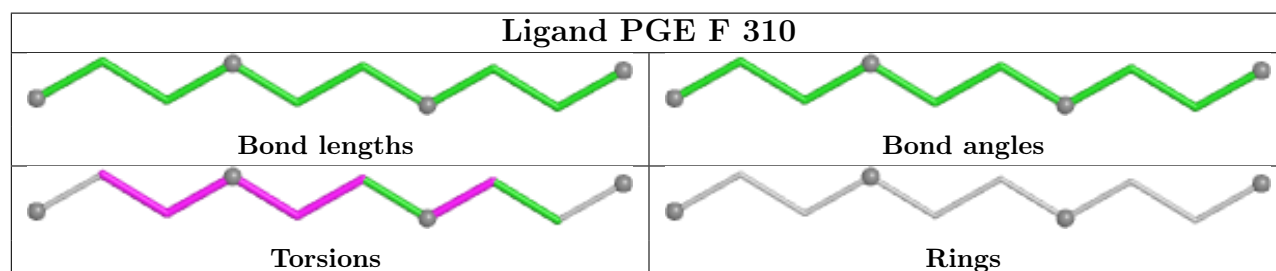
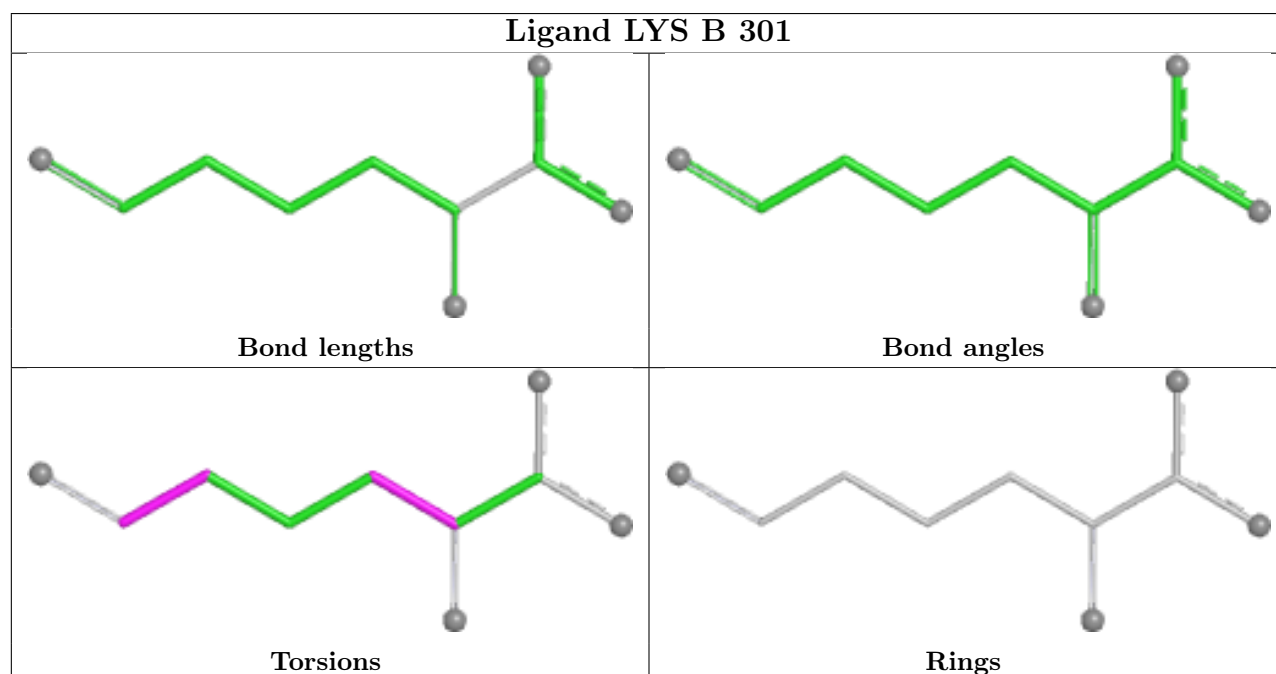
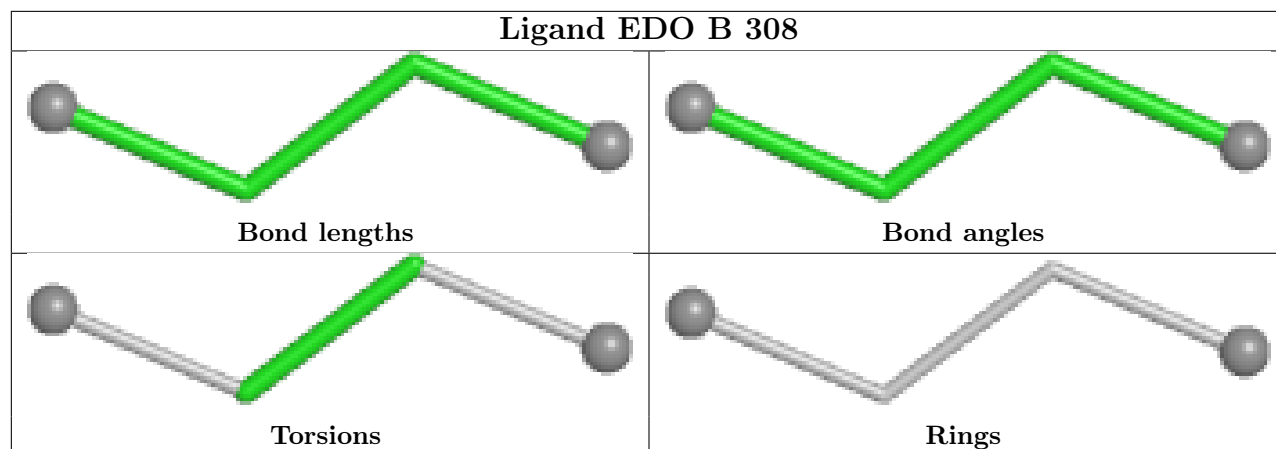


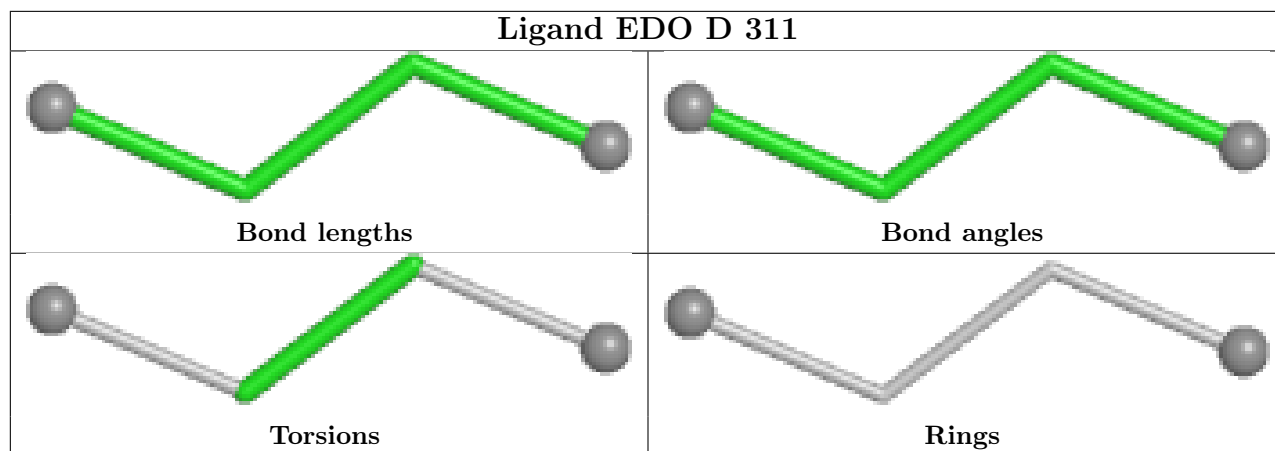


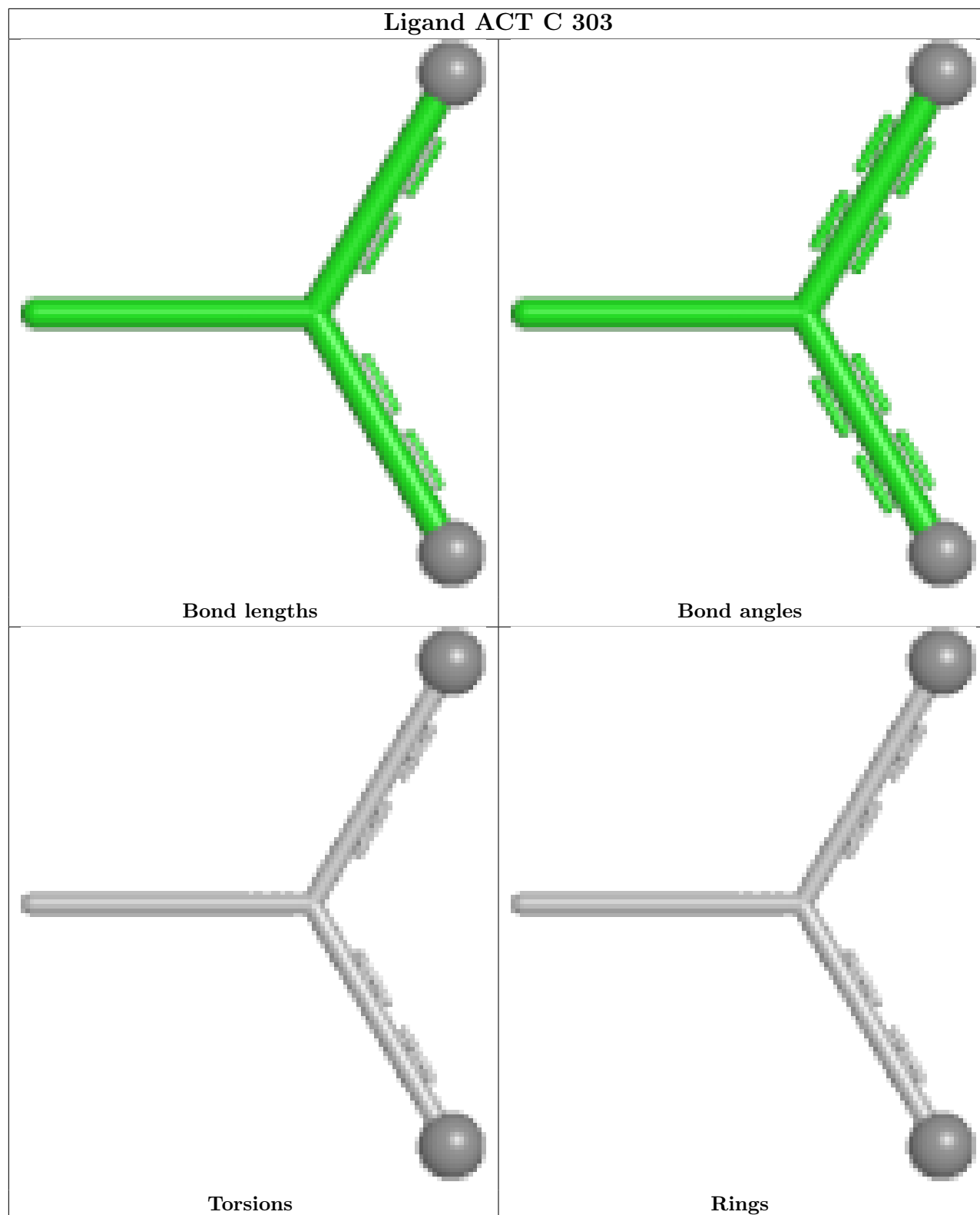


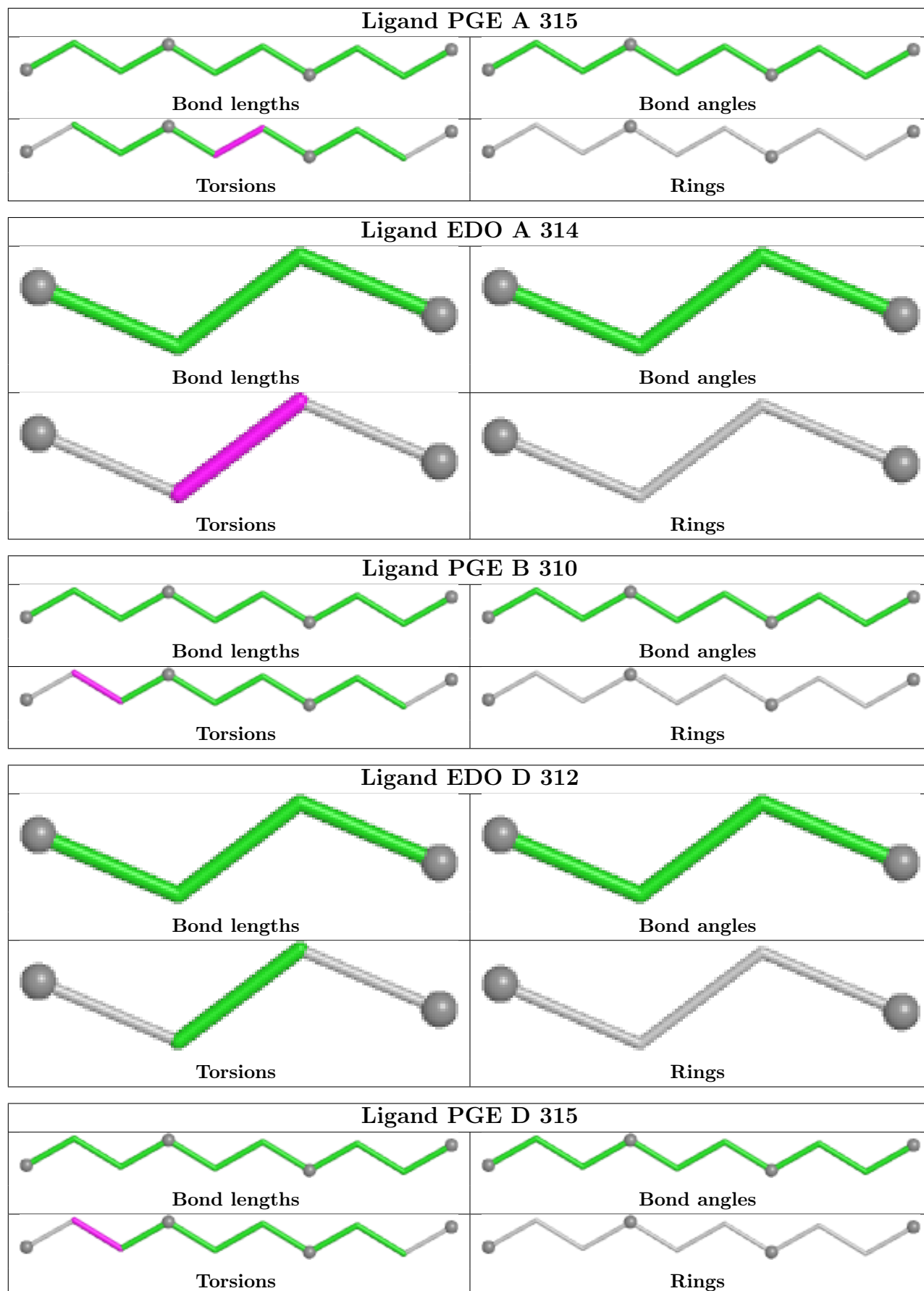


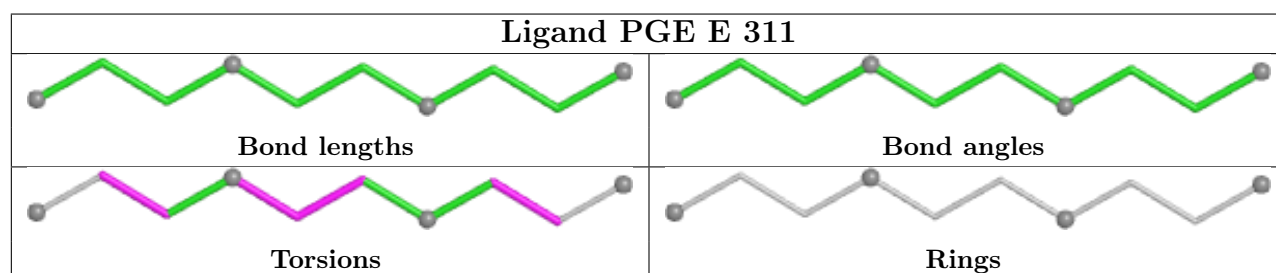
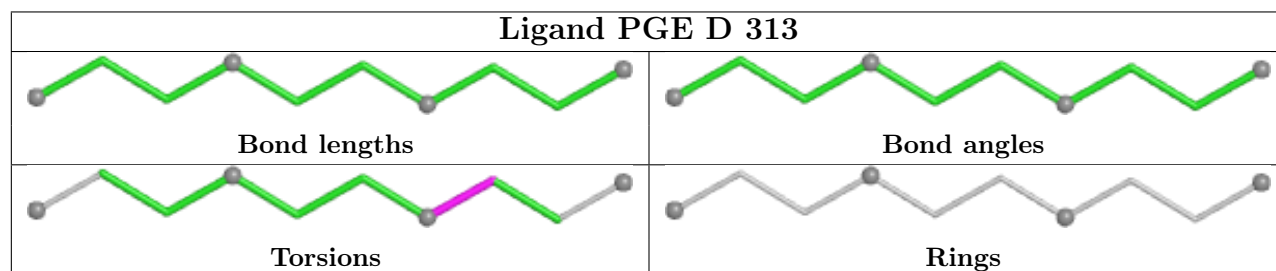
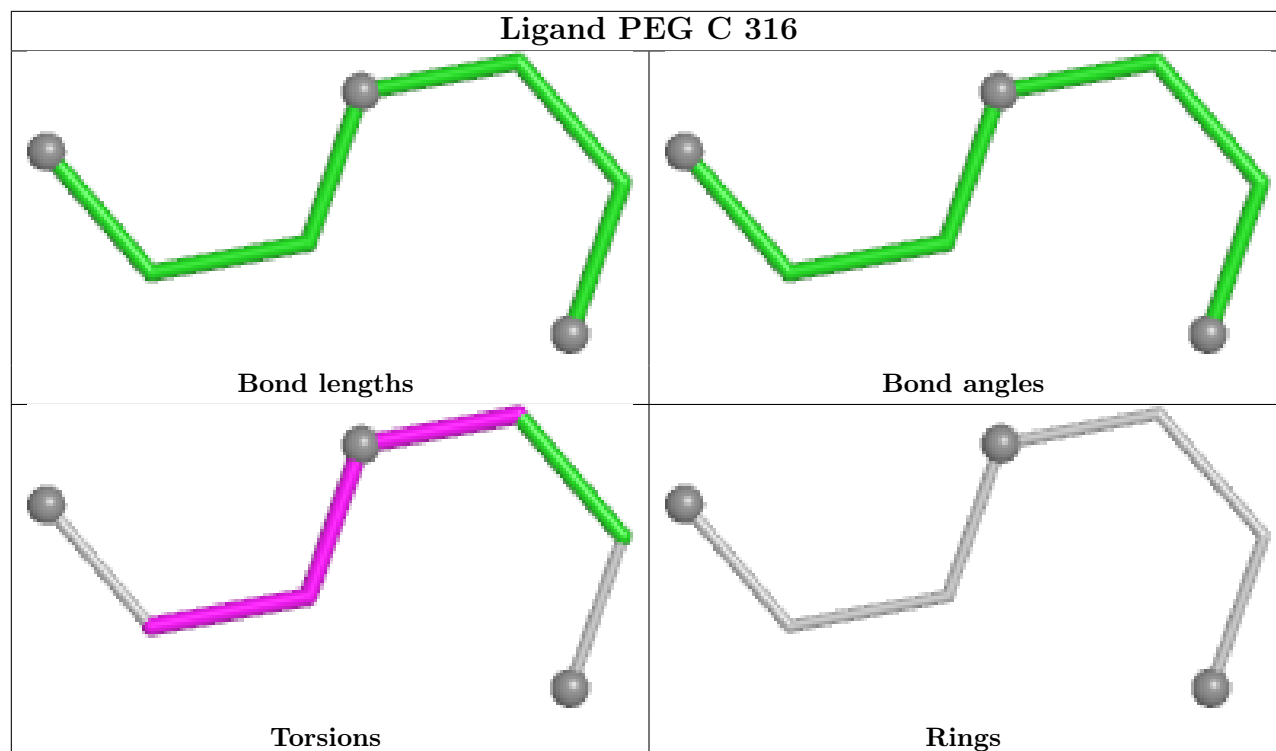


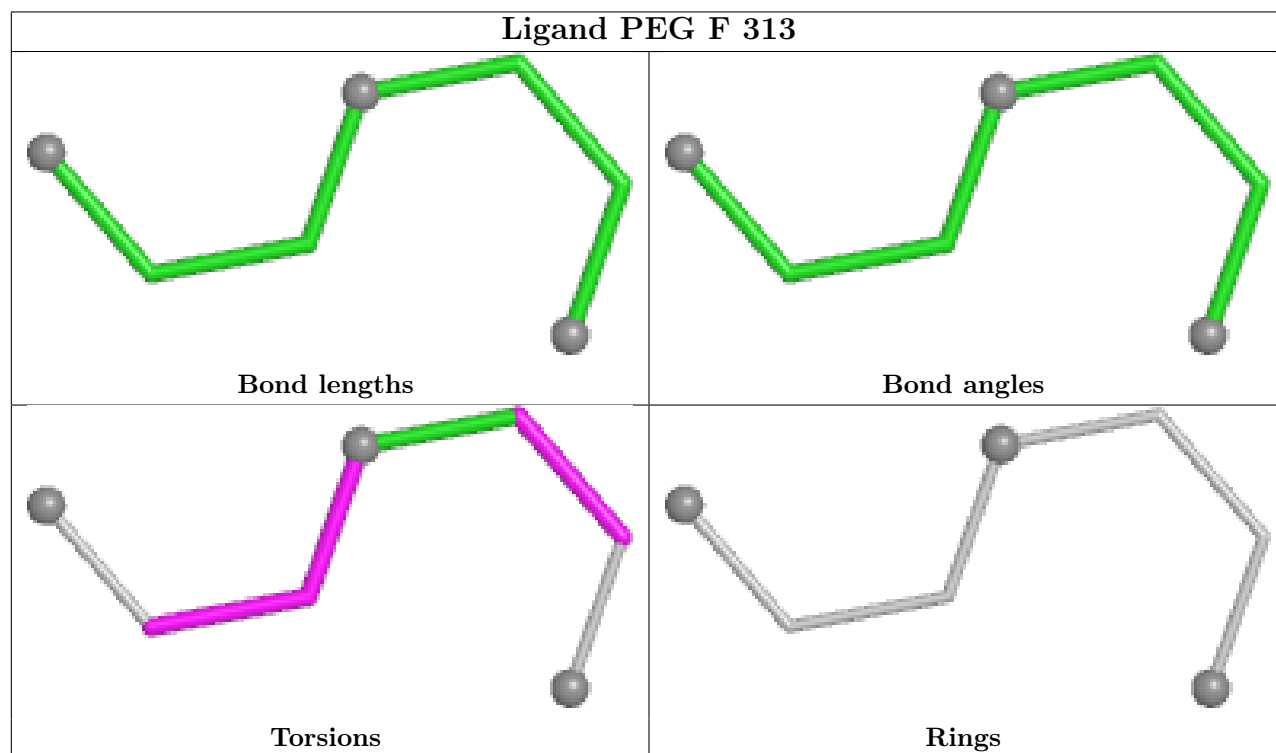
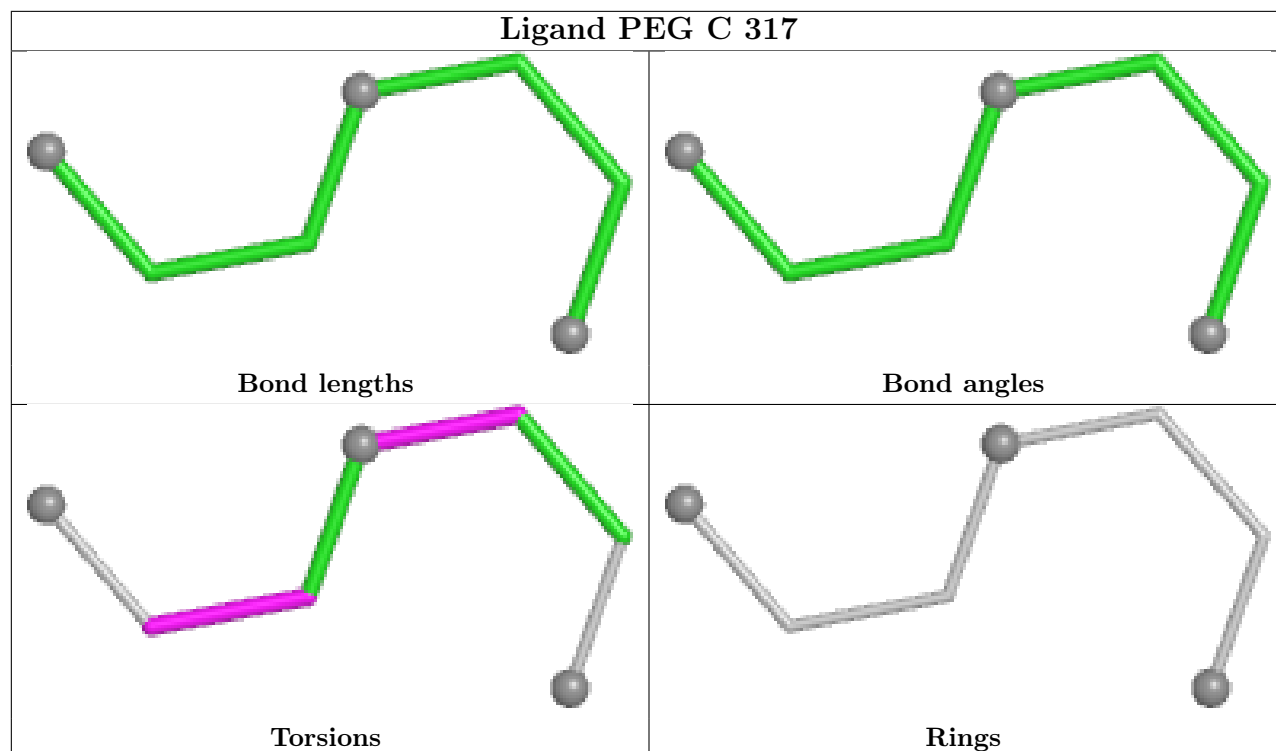


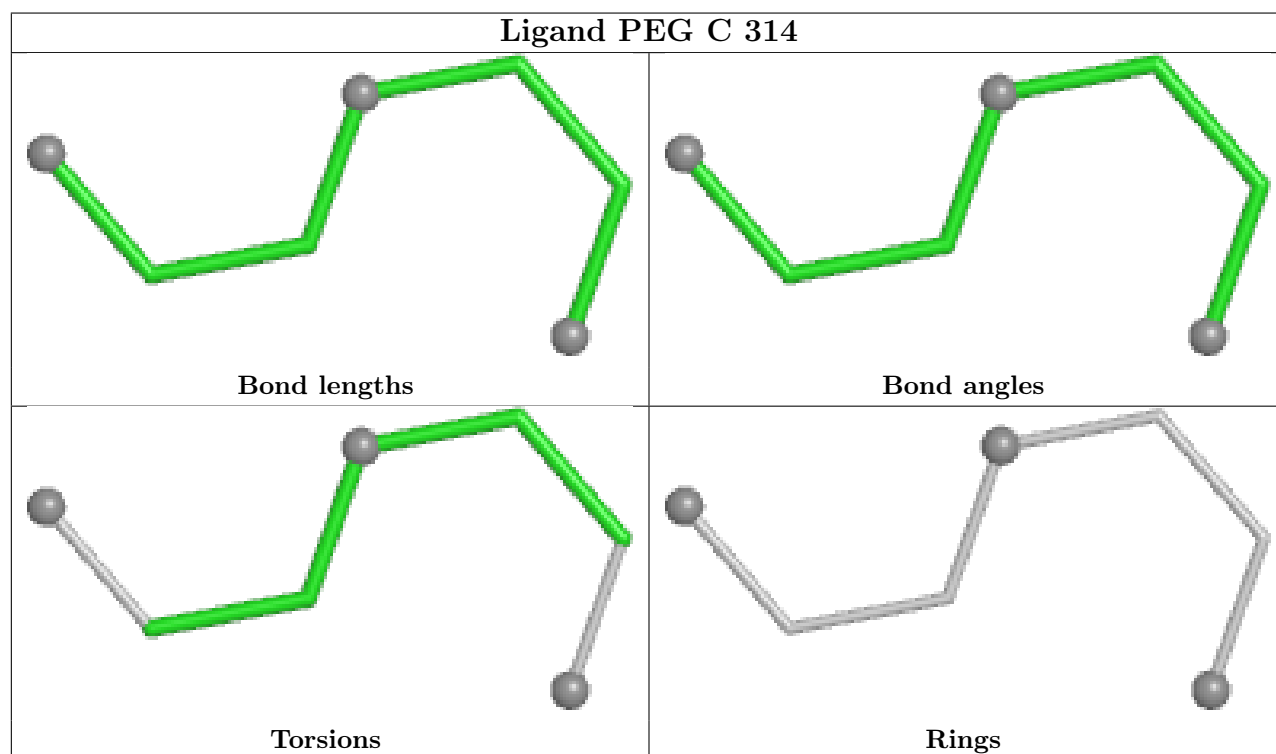
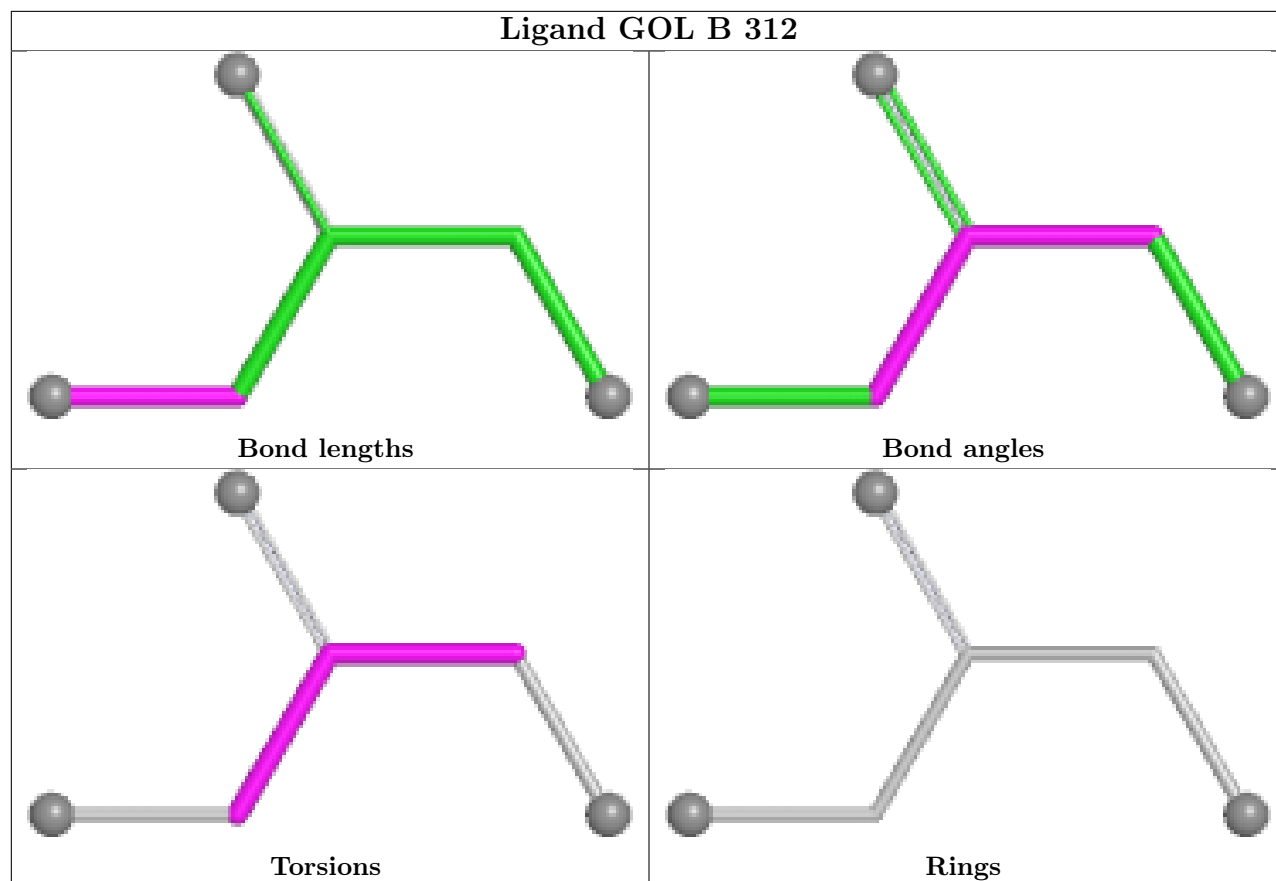


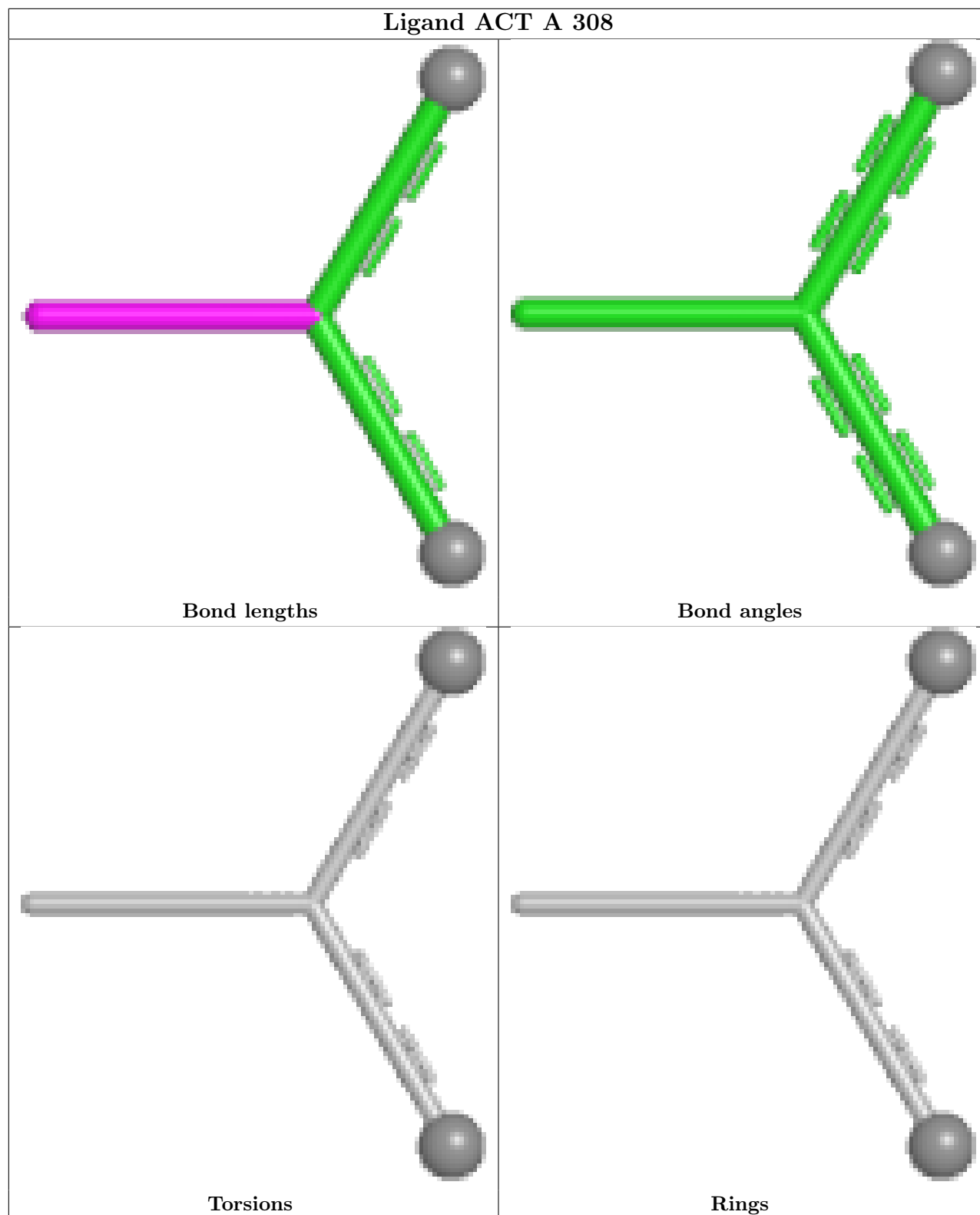


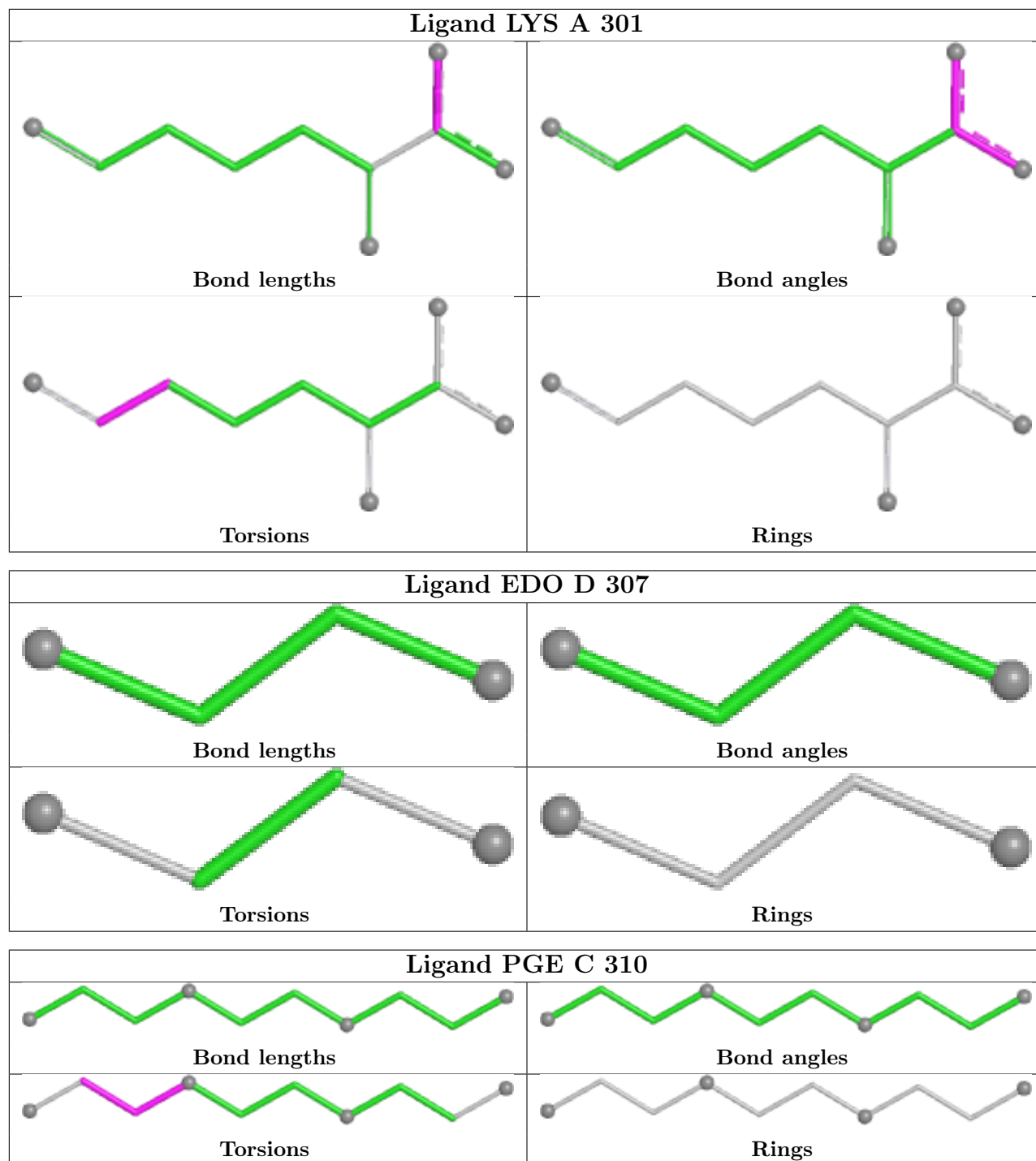


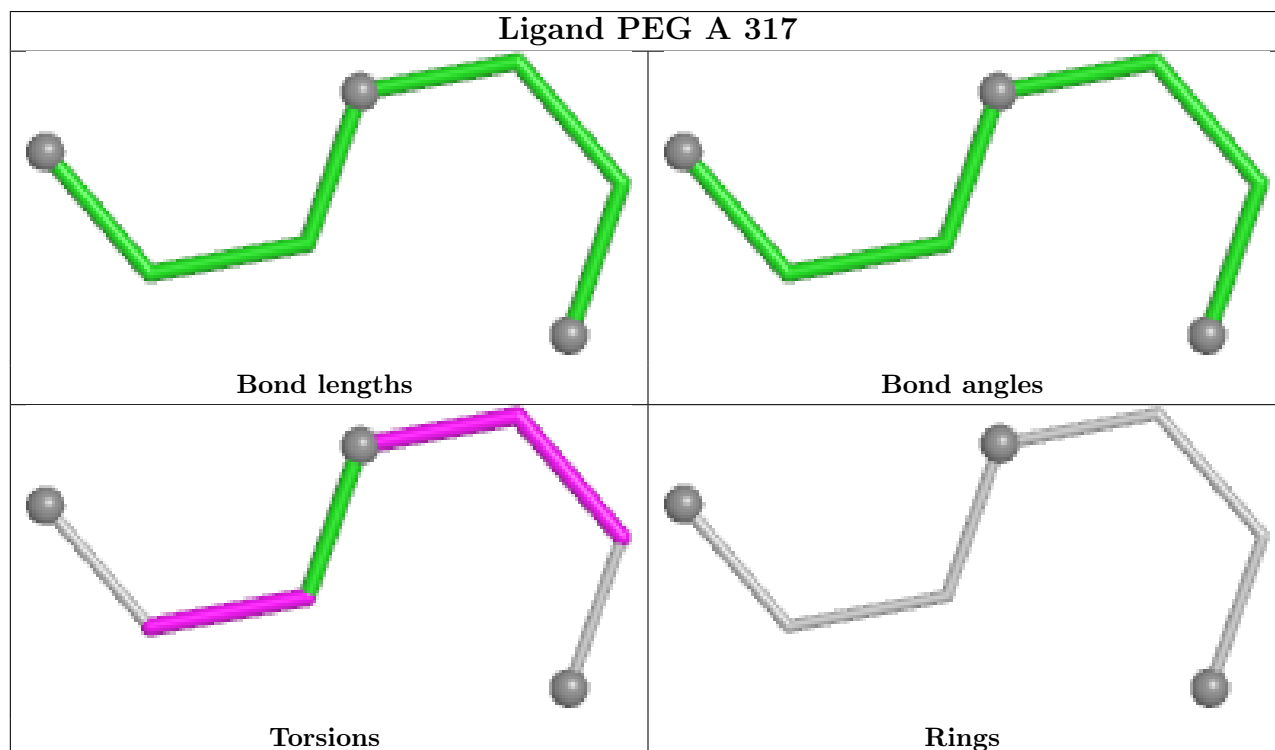
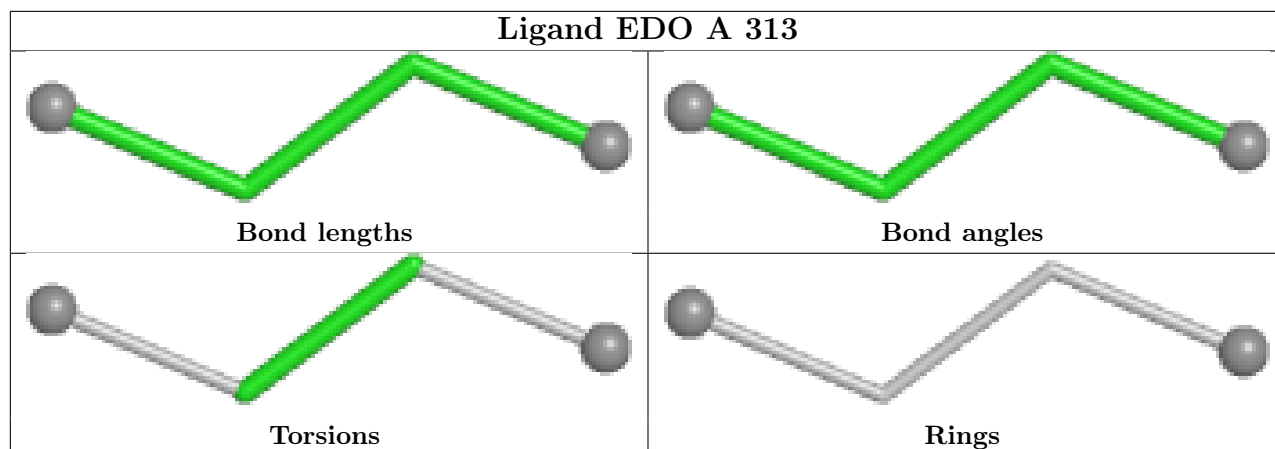


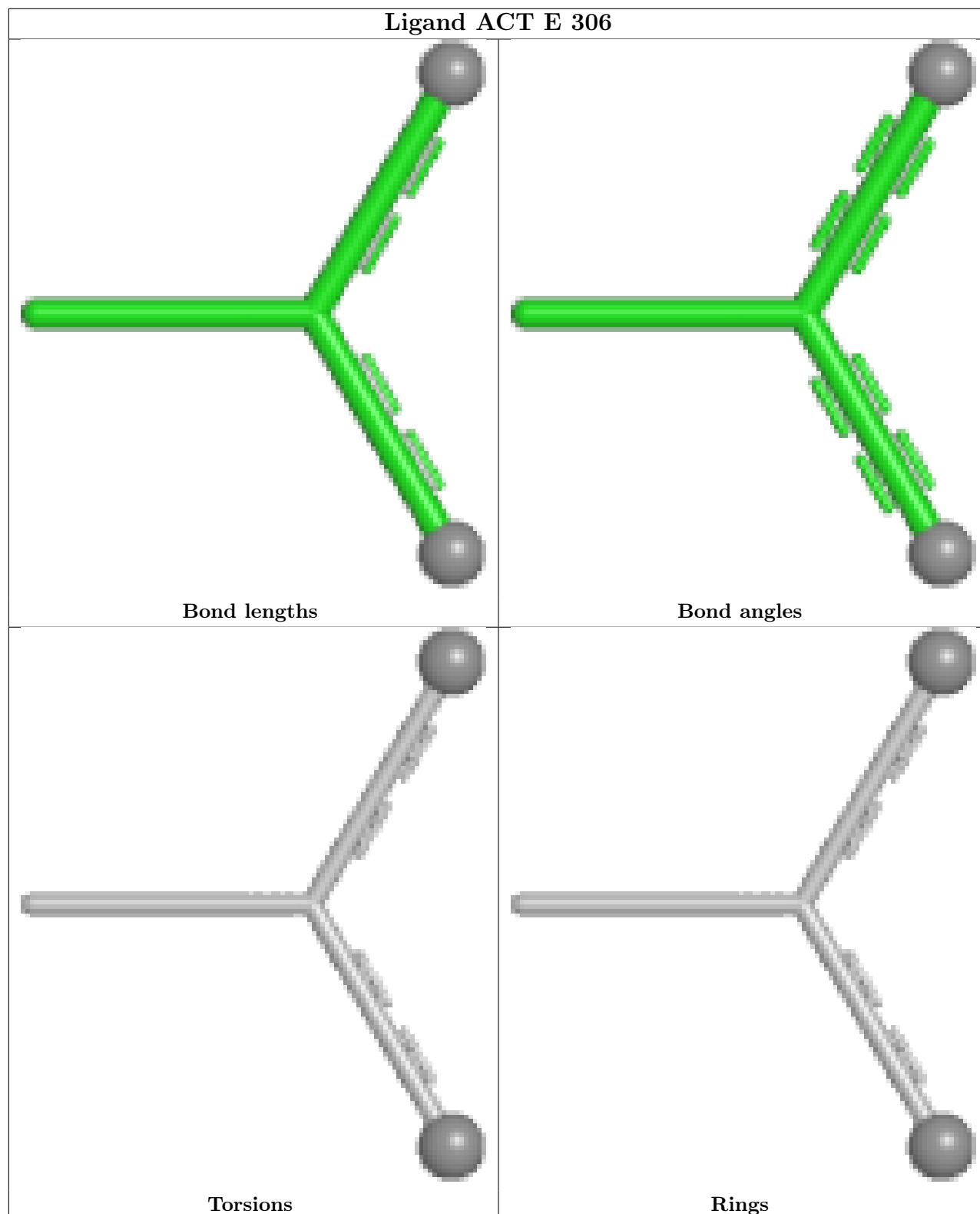


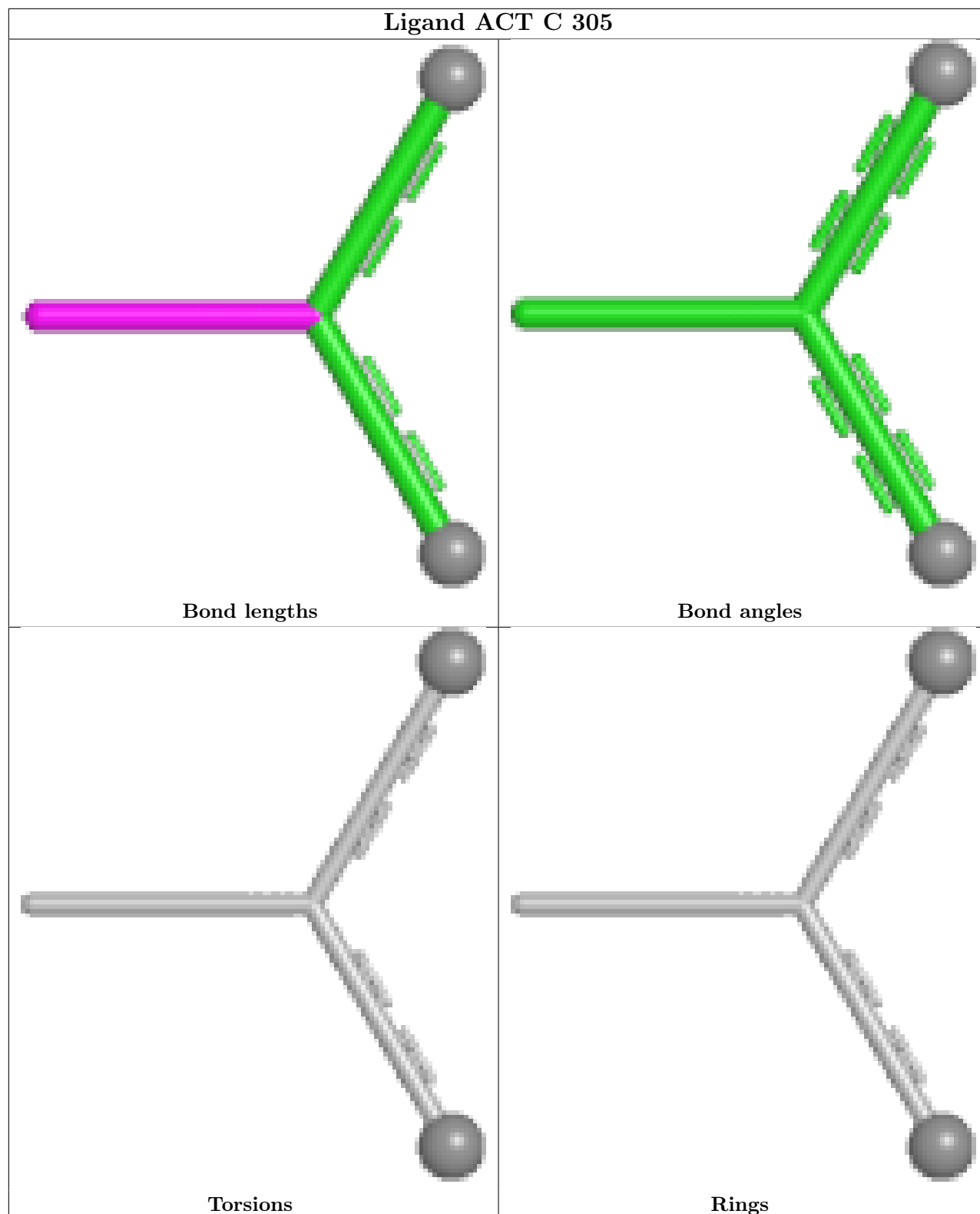


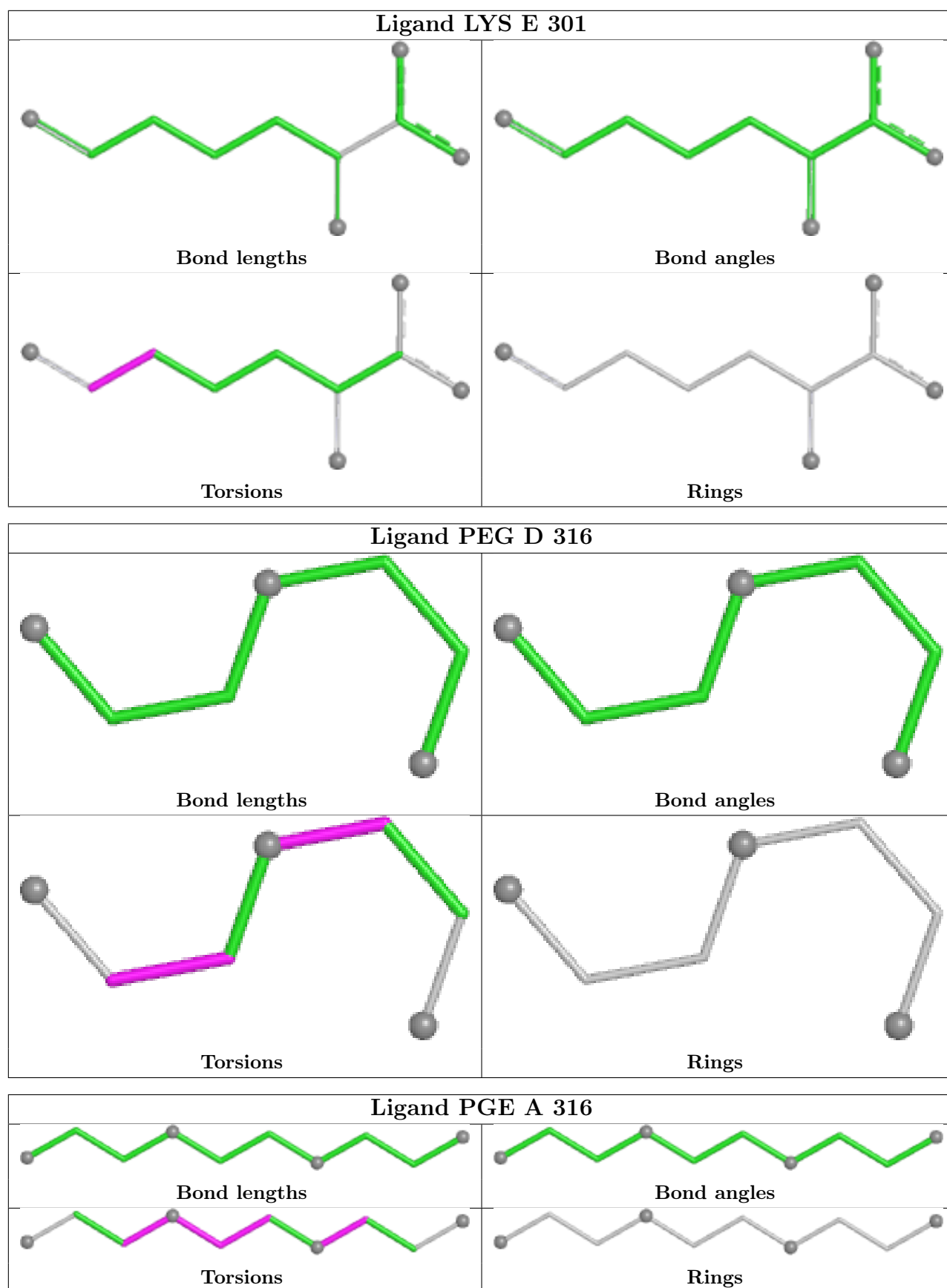


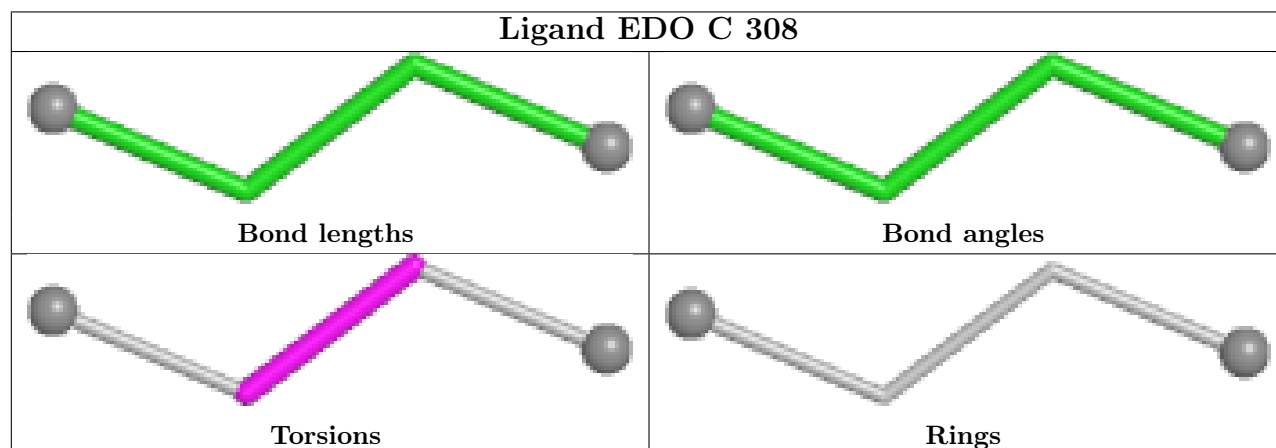
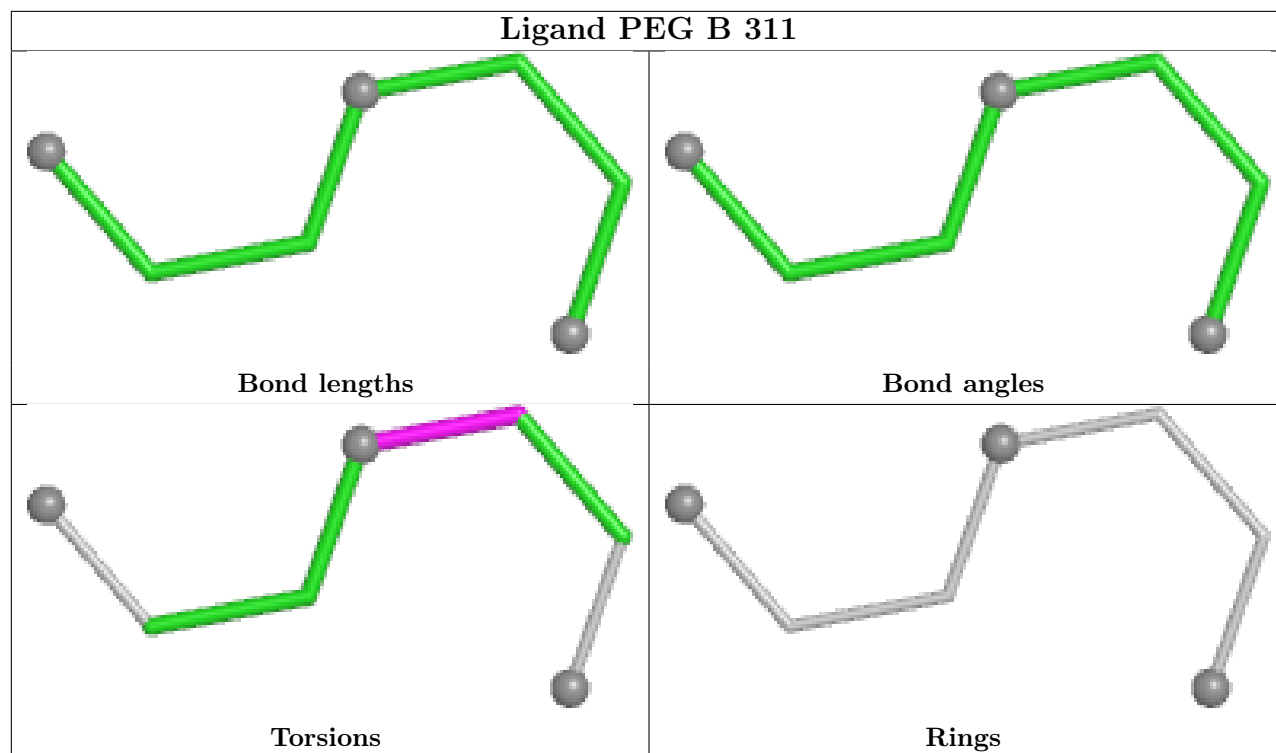


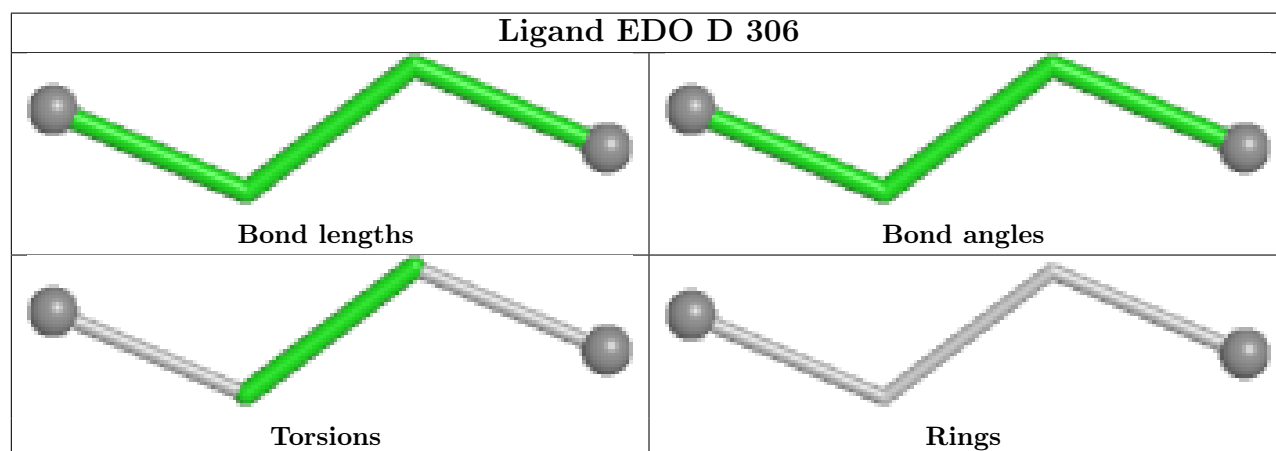
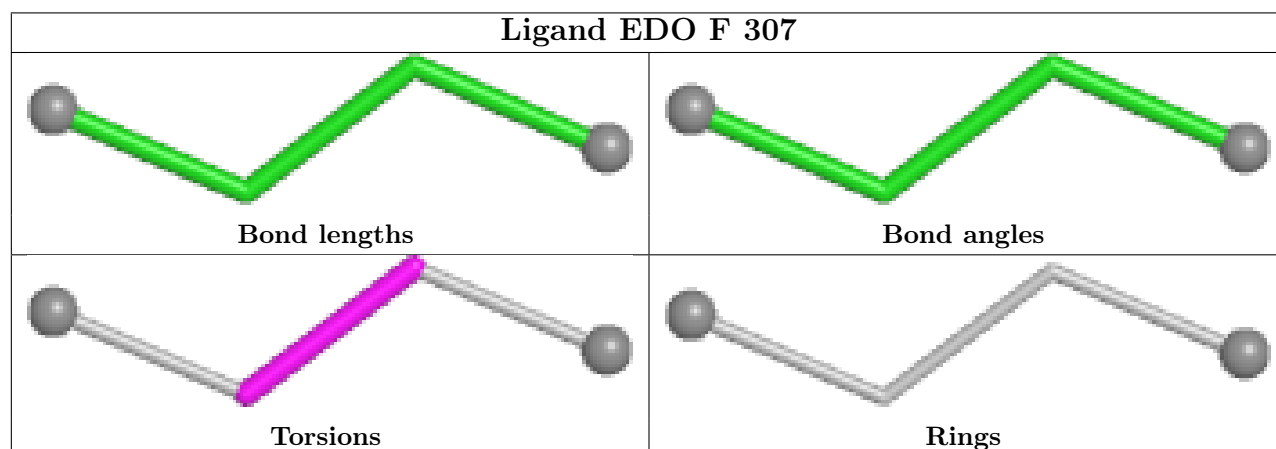
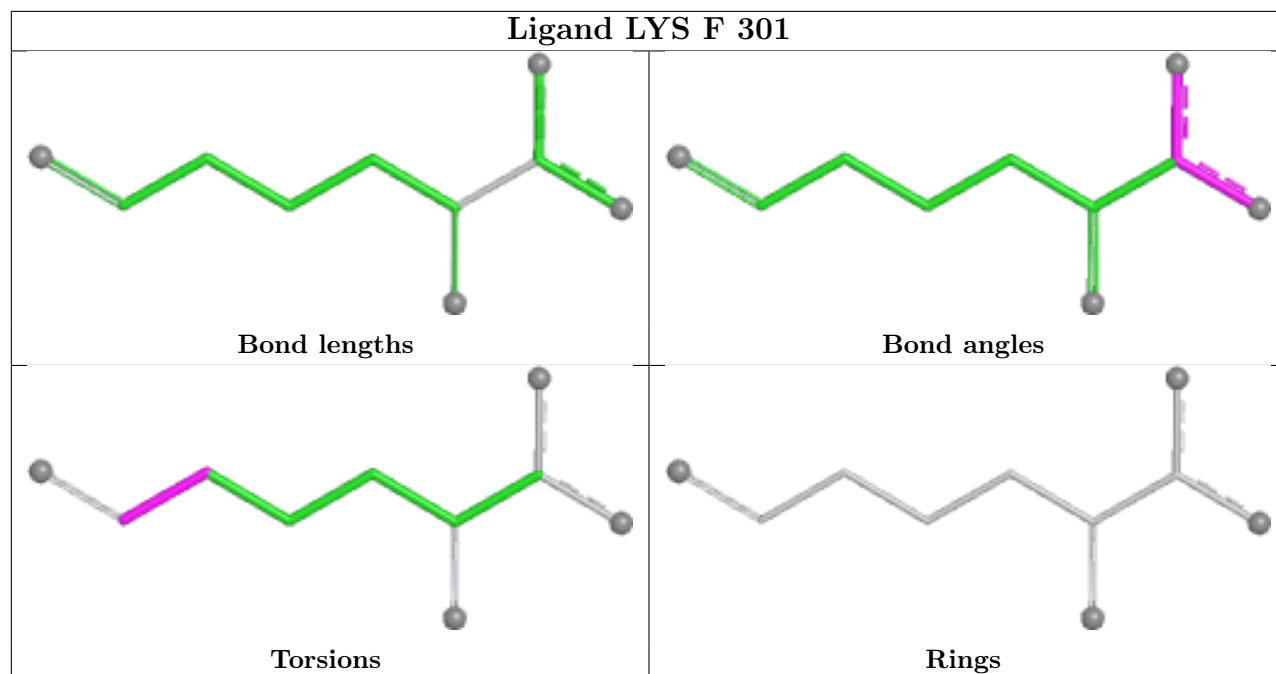


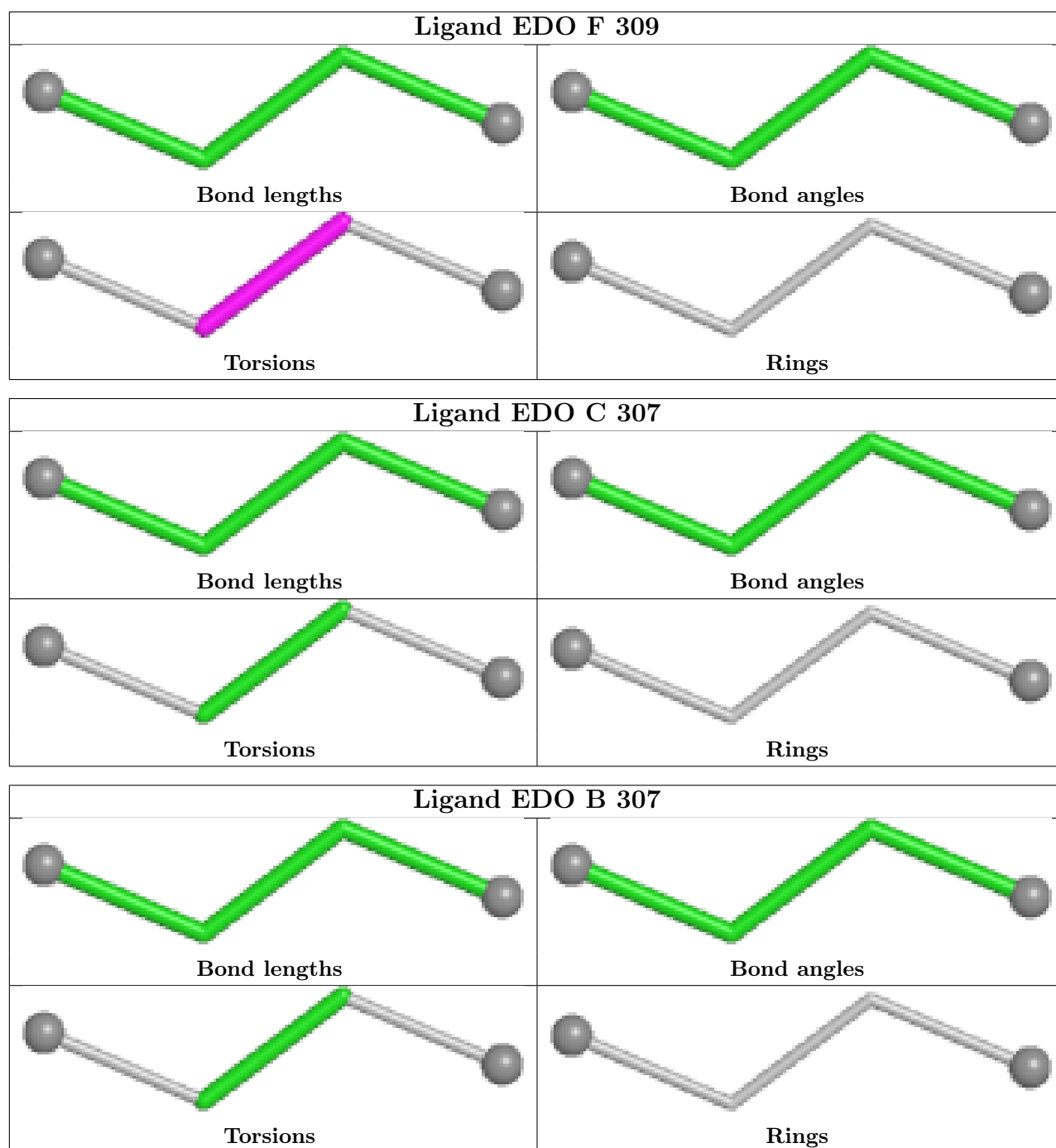


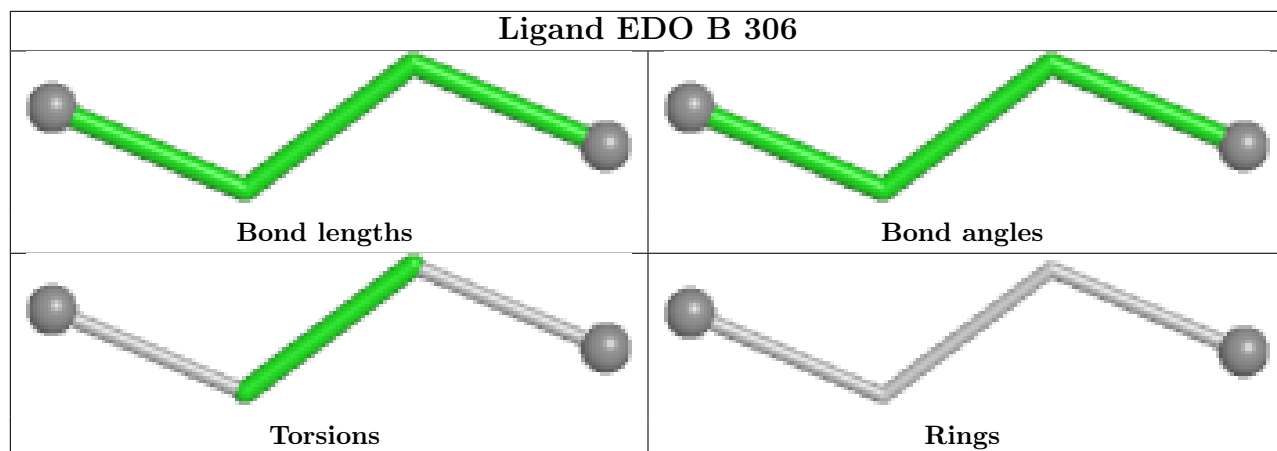


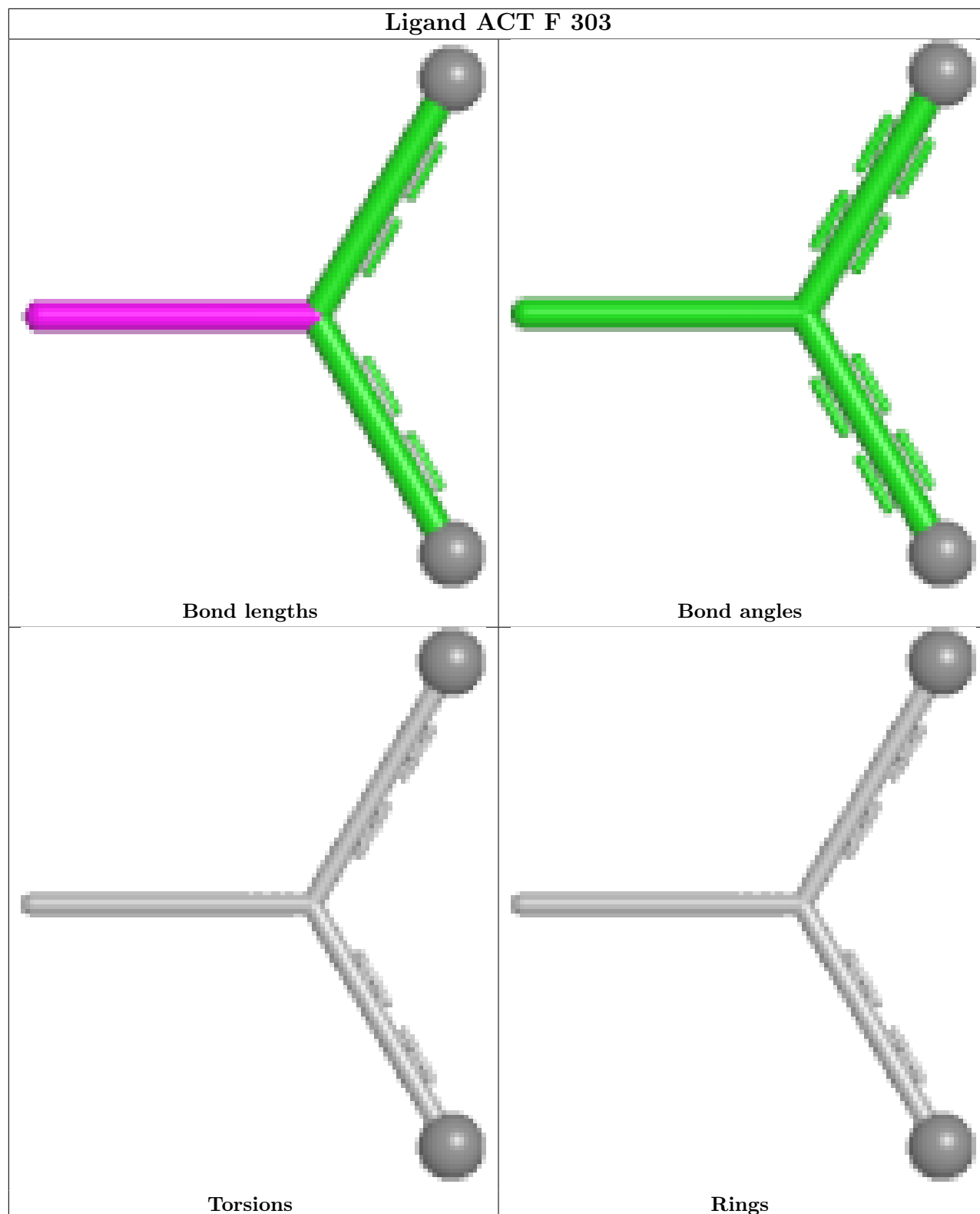


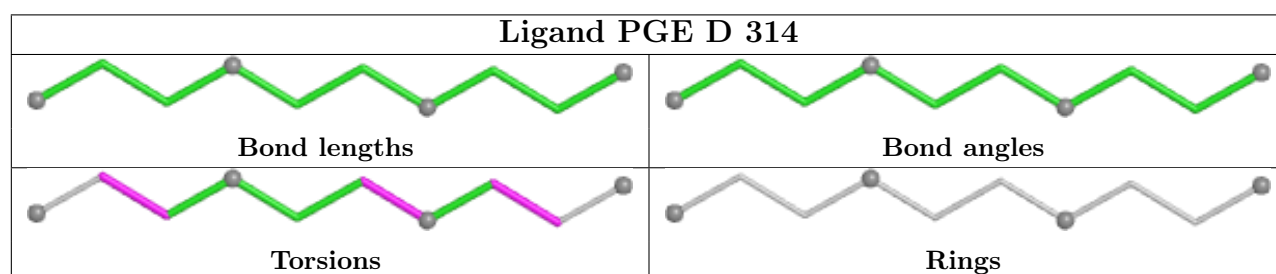
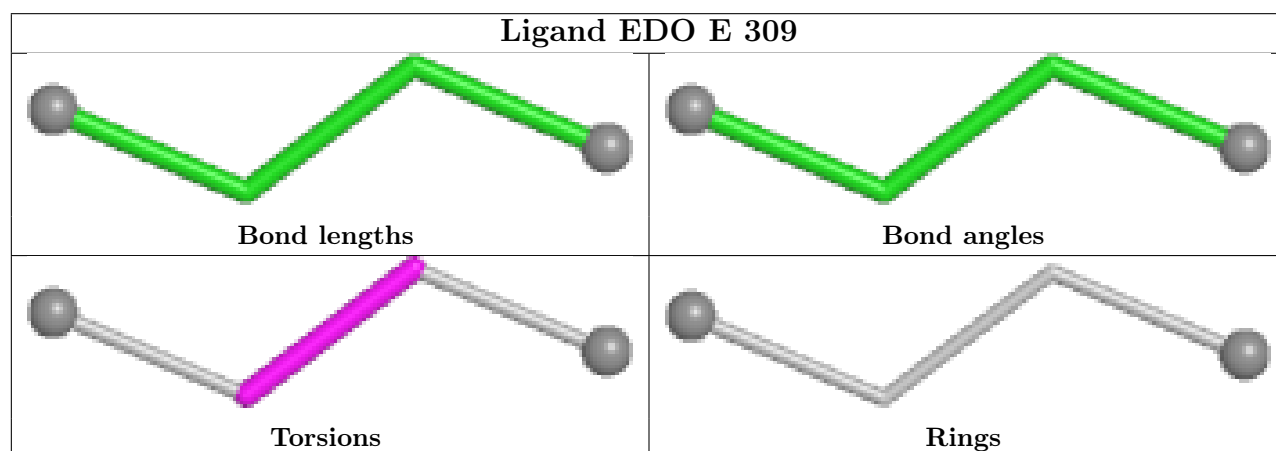
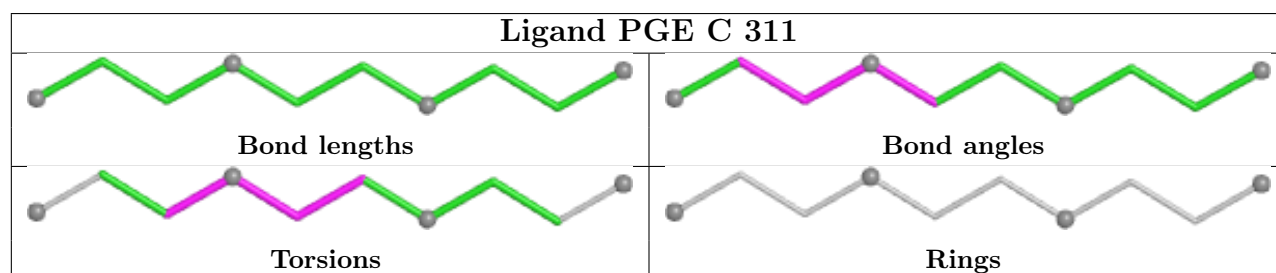
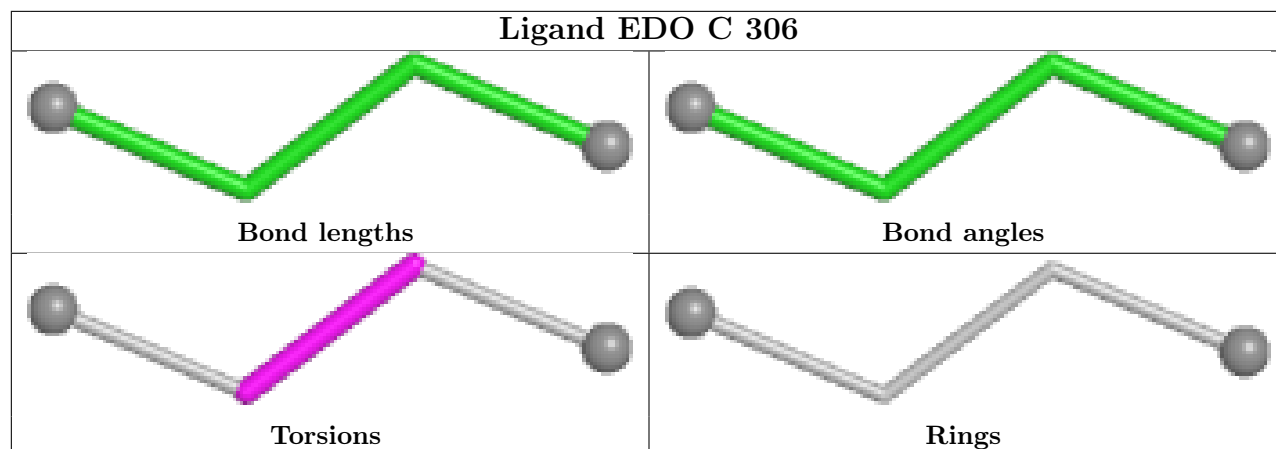


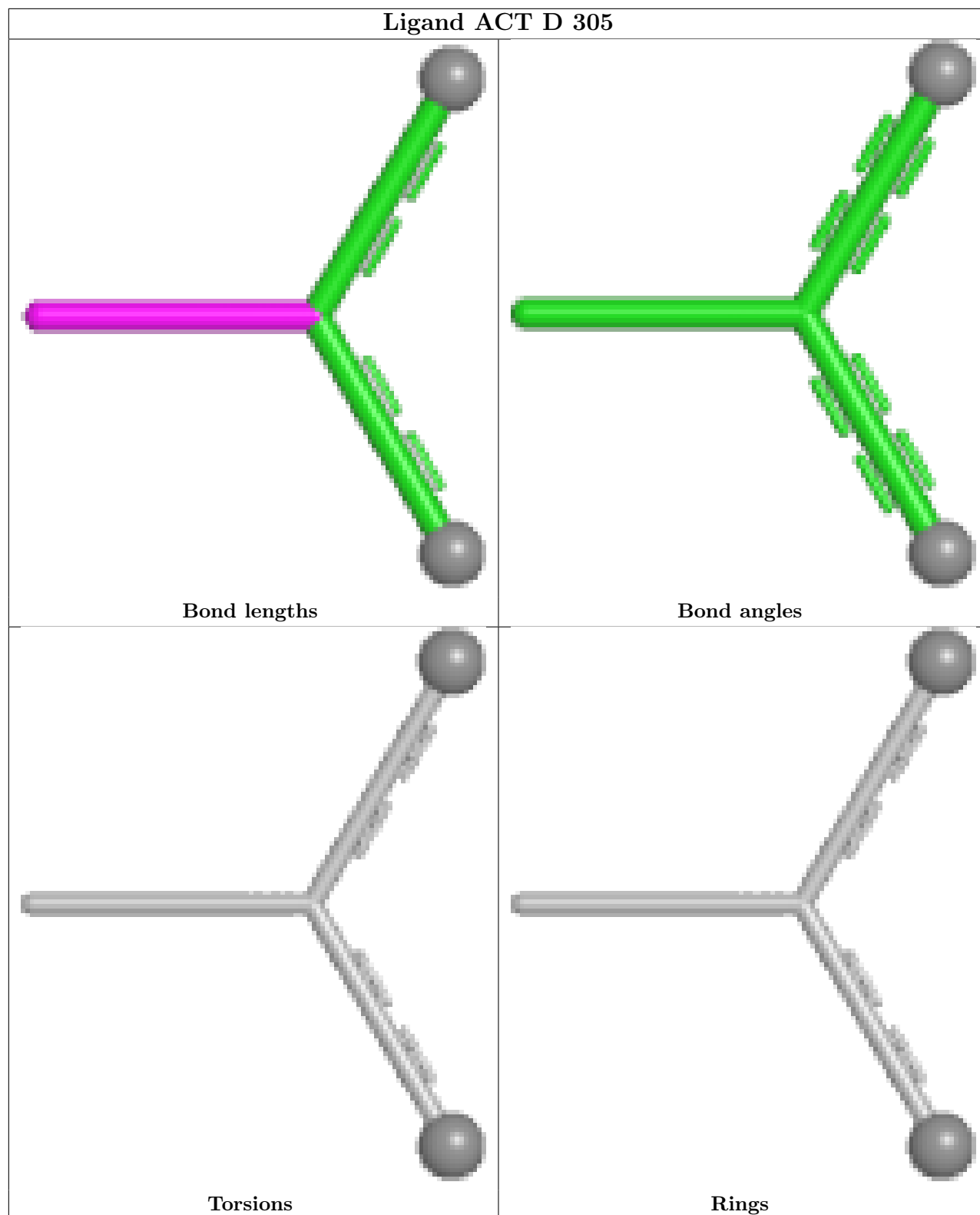












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	294/310 (94%)	-0.54	1 (0%) 90 92	10, 21, 34, 51	2 (0%)
1	B	295/310 (95%)	-0.53	1 (0%) 90 92	9, 21, 34, 47	2 (0%)
1	C	296/310 (95%)	-0.56	1 (0%) 90 92	9, 21, 35, 51	4 (1%)
1	D	295/310 (95%)	-0.53	1 (0%) 90 92	9, 21, 38, 45	1 (0%)
1	E	295/310 (95%)	-0.47	2 (0%) 84 88	13, 22, 37, 57	1 (0%)
1	F	296/310 (95%)	-0.46	1 (0%) 90 92	16, 21, 38, 53	0
All	All	1771/1860 (95%)	-0.51	7 (0%) 88 91	9, 21, 37, 57	10 (0%)

The worst 5 of 7 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	2	ASP	3.1
1	F	2	ASP	2.6
1	A	4	ASN	2.6
1	E	216	ASP	2.3
1	E	3	LYS	2.2

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

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q < 0.9’ lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
1	KPI	E	166	14/15	0.97	0.05	16,18,21,24	0
1	KPI	F	166	14/15	0.97	0.05	15,17,25,25	0
1	KPI	C	166	14/15	0.98	0.04	16,18,22,23	0
1	KPI	D	166	14/15	0.98	0.04	16,17,24,25	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
1	KPI	A	166	14/15	0.98	0.04	14,17,24,26	0
1	KPI	B	166	14/15	0.98	0.04	15,17,22,24	0

### 6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

### 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
4	ACT	F	304	4/4	0.61	0.24	65,69,70,72	0
4	ACT	A	310	4/4	0.63	0.22	61,65,65,71	0
4	ACT	E	306	4/4	0.66	0.22	64,66,67,71	0
5	EDO	F	307	4/4	0.69	0.28	39,42,48,50	0
4	ACT	D	305	4/4	0.70	0.23	60,64,65,66	0
4	ACT	A	308	4/4	0.70	0.23	63,64,66,68	0
7	PEG	C	313	7/7	0.70	0.21	50,54,63,64	0
4	ACT	C	304	4/4	0.71	0.22	50,57,61,63	0
4	ACT	E	305	4/4	0.71	0.20	52,59,59,63	0
6	PGE	D	315	10/10	0.72	0.20	59,65,72,72	0
5	EDO	B	309	4/4	0.72	0.22	55,56,57,59	0
7	PEG	C	314	7/7	0.72	0.19	58,64,69,70	0
7	PEG	C	316	7/7	0.72	0.21	61,67,69,70	0
6	PGE	F	310	10/10	0.74	0.20	58,65,72,73	0
6	PGE	D	314	10/10	0.75	0.23	56,62,67,67	0
5	EDO	C	306	4/4	0.75	0.22	52,53,54,56	0
7	PEG	F	313	7/7	0.75	0.20	62,62,67,68	0
5	EDO	E	308	4/4	0.76	0.21	67,68,69,69	0
7	PEG	C	315	7/7	0.77	0.20	56,58,68,71	0
8	GOL	B	312	6/6	0.77	0.20	45,50,52,57	0
4	ACT	D	304	4/4	0.78	0.22	64,67,68,68	0
7	PEG	A	317	7/7	0.78	0.22	31,48,62,64	0
3	MG	B	304	1/1	0.79	0.28	73,73,73,73	0
5	EDO	E	310	4/4	0.79	0.17	59,60,64,64	0
5	EDO	B	307	4/4	0.79	0.19	50,52,54,59	0
6	PGE	A	316	10/10	0.79	0.19	52,60,64,66	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
4	ACT	C	305	4/4	0.79	0.18	45,49,50,59	0
4	ACT	B	305	4/4	0.79	0.20	54,58,59,61	0
5	EDO	E	307	4/4	0.79	0.18	50,56,57,60	0
7	PEG	C	312	7/7	0.80	0.19	48,58,63,63	0
7	PEG	B	311	7/7	0.81	0.19	59,61,64,66	0
7	PEG	C	317	7/7	0.82	0.17	43,50,55,57	0
5	EDO	F	308	4/4	0.82	0.18	53,55,58,59	0
5	EDO	E	309	4/4	0.82	0.15	46,48,50,51	0
8	GOL	D	317	6/6	0.82	0.16	40,44,51,51	0
5	EDO	B	308	4/4	0.83	0.17	43,50,52,53	0
5	EDO	A	312	4/4	0.83	0.14	58,60,61,63	0
7	PEG	D	316	7/7	0.84	0.21	54,58,63,65	0
5	EDO	D	311	4/4	0.84	0.17	46,49,49,54	0
7	PEG	F	312	7/7	0.85	0.19	36,56,61,61	0
5	EDO	C	308	4/4	0.85	0.15	41,44,46,47	0
5	EDO	F	306	4/4	0.86	0.19	56,59,61,62	0
5	EDO	A	313	4/4	0.86	0.16	49,51,53,56	0
5	EDO	B	306	4/4	0.86	0.15	50,54,55,55	0
5	EDO	C	307	4/4	0.86	0.17	53,55,57,58	0
8	GOL	F	314	6/6	0.86	0.15	50,52,56,57	0
6	PGE	E	311	10/10	0.87	0.14	41,50,56,62	0
3	MG	A	307	1/1	0.87	0.25	72,72,72,72	0
4	ACT	F	303	4/4	0.87	0.15	61,61,64,66	0
4	ACT	A	309	4/4	0.87	0.16	42,50,50,51	0
3	MG	A	305	1/1	0.87	0.23	71,71,71,71	0
6	PGE	C	310	10/10	0.87	0.13	39,44,51,59	0
5	EDO	C	309	4/4	0.87	0.17	61,63,67,69	0
5	EDO	F	305	4/4	0.87	0.17	48,49,50,50	0
5	EDO	D	310	4/4	0.88	0.17	50,53,56,58	0
6	PGE	C	311	10/10	0.88	0.14	27,36,45,46	0
5	EDO	D	307	4/4	0.88	0.15	59,61,62,62	0
5	EDO	D	312	4/4	0.88	0.21	41,43,43,45	0
4	ACT	D	303	4/4	0.89	0.13	42,48,50,54	0
4	ACT	E	304	4/4	0.89	0.13	34,35,43,48	0
6	PGE	A	315	10/10	0.89	0.13	40,44,58,59	0
5	EDO	A	314	4/4	0.90	0.14	30,35,43,45	0
7	PEG	F	311	7/7	0.91	0.12	39,44,52,54	0
5	EDO	F	309	4/4	0.91	0.13	41,47,52,56	0
3	MG	E	302	1/1	0.91	0.23	57,57,57,57	0
5	EDO	A	311	4/4	0.92	0.21	29,29,36,44	0
5	EDO	D	309	4/4	0.92	0.13	39,44,50,52	0
6	PGE	B	310	10/10	0.92	0.12	42,47,53,58	0

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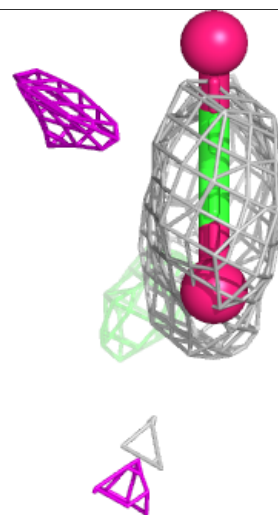
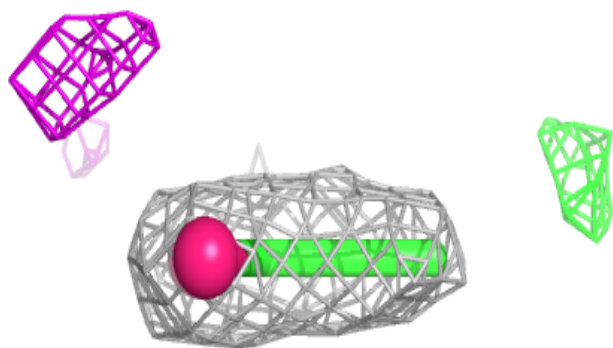
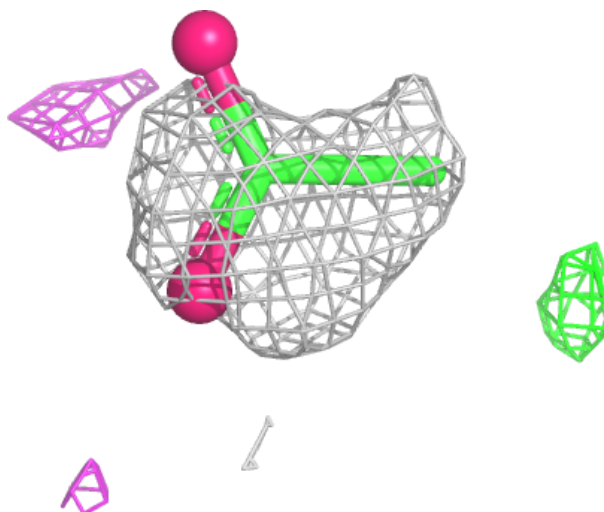
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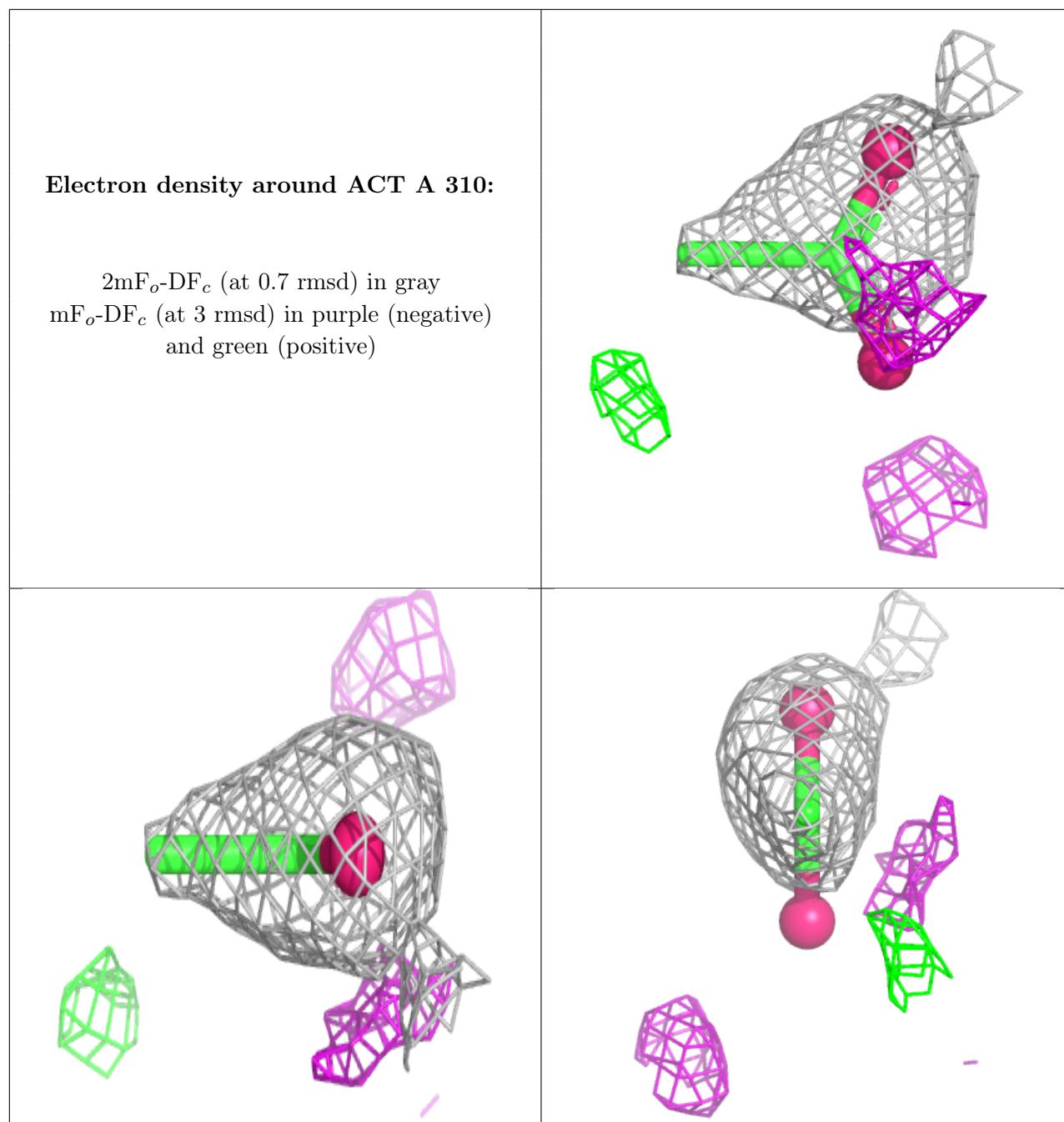
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
6	PGE	D	313	10/10	0.93	0.09	40,45,52,59	0
5	EDO	D	308	4/4	0.93	0.11	25,30,39,47	0
4	ACT	C	303	4/4	0.94	0.10	31,34,41,53	0
2	LYS	B	301	10/10	0.95	0.08	17,20,27,38	0
3	MG	A	306	1/1	0.97	0.07	37,37,37,37	0
2	LYS	F	301	10/10	0.97	0.05	17,20,23,25	0
3	MG	B	302	1/1	0.97	0.06	22,22,22,22	0
2	LYS	A	301	10/10	0.97	0.05	18,20,21,25	0
2	LYS	C	301	10/10	0.98	0.05	17,20,22,23	0
5	EDO	D	306	4/4	0.98	0.04	20,21,22,23	0
3	MG	A	302	1/1	0.98	0.04	23,23,23,23	0
3	MG	A	304	1/1	0.98	0.09	38,38,38,38	0
2	LYS	D	301	10/10	0.98	0.04	19,20,22,24	0
2	LYS	E	301	10/10	0.98	0.05	17,20,27,28	0
3	MG	B	303	1/1	0.99	0.04	16,16,16,16	0
3	MG	E	303	1/1	0.99	0.06	17,17,17,17	0
3	MG	D	302	1/1	1.00	0.07	17,17,17,17	0
3	MG	A	303	1/1	1.00	0.04	15,15,15,15	0
3	MG	C	302	1/1	1.00	0.08	16,16,16,16	0
3	MG	F	302	1/1	1.00	0.05	16,16,16,16	0

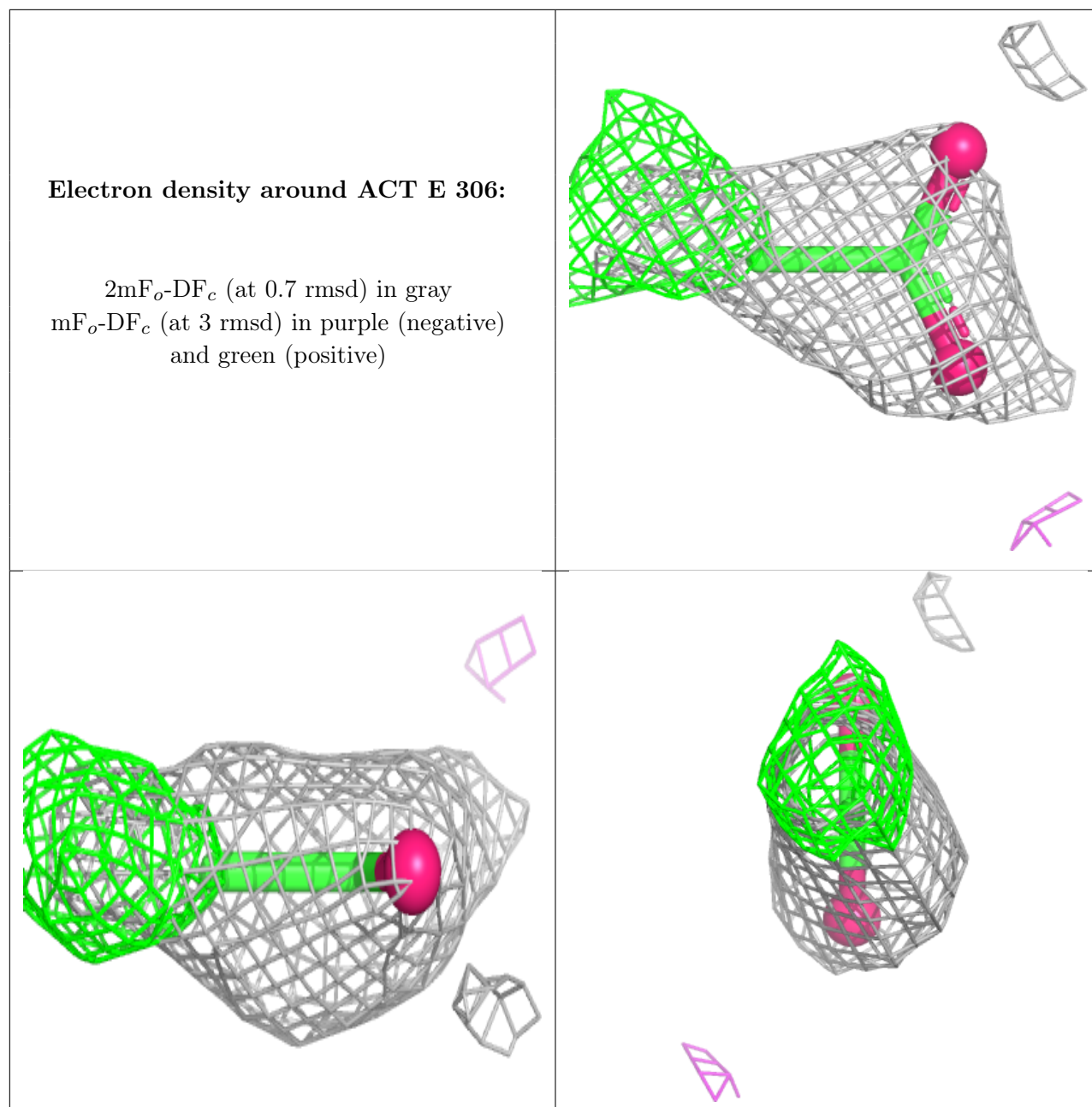
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

**Electron density around ACT F 304:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

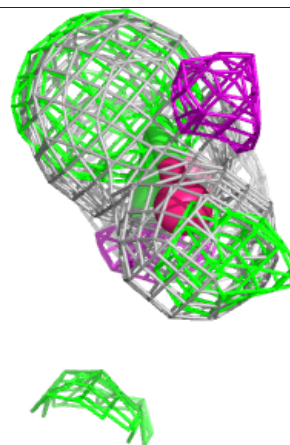
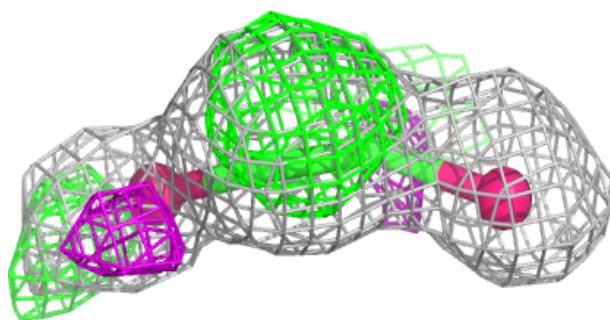
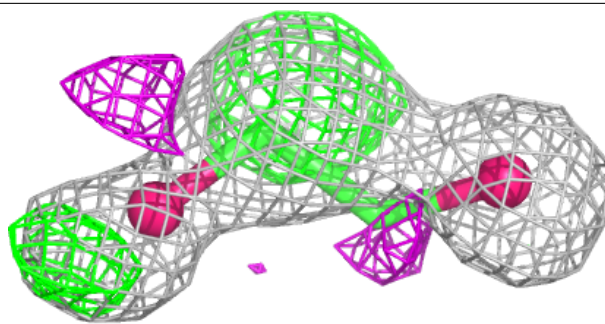


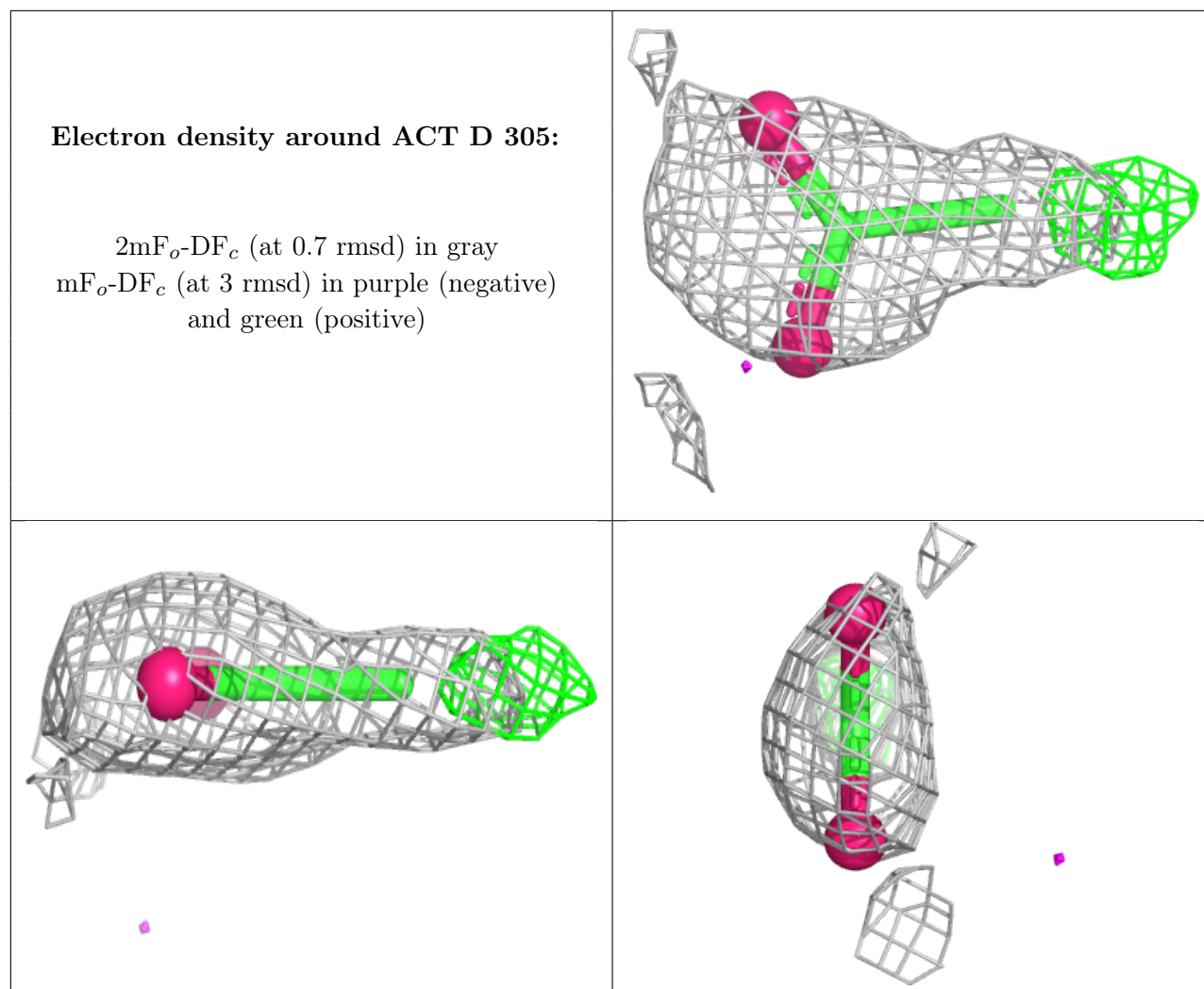


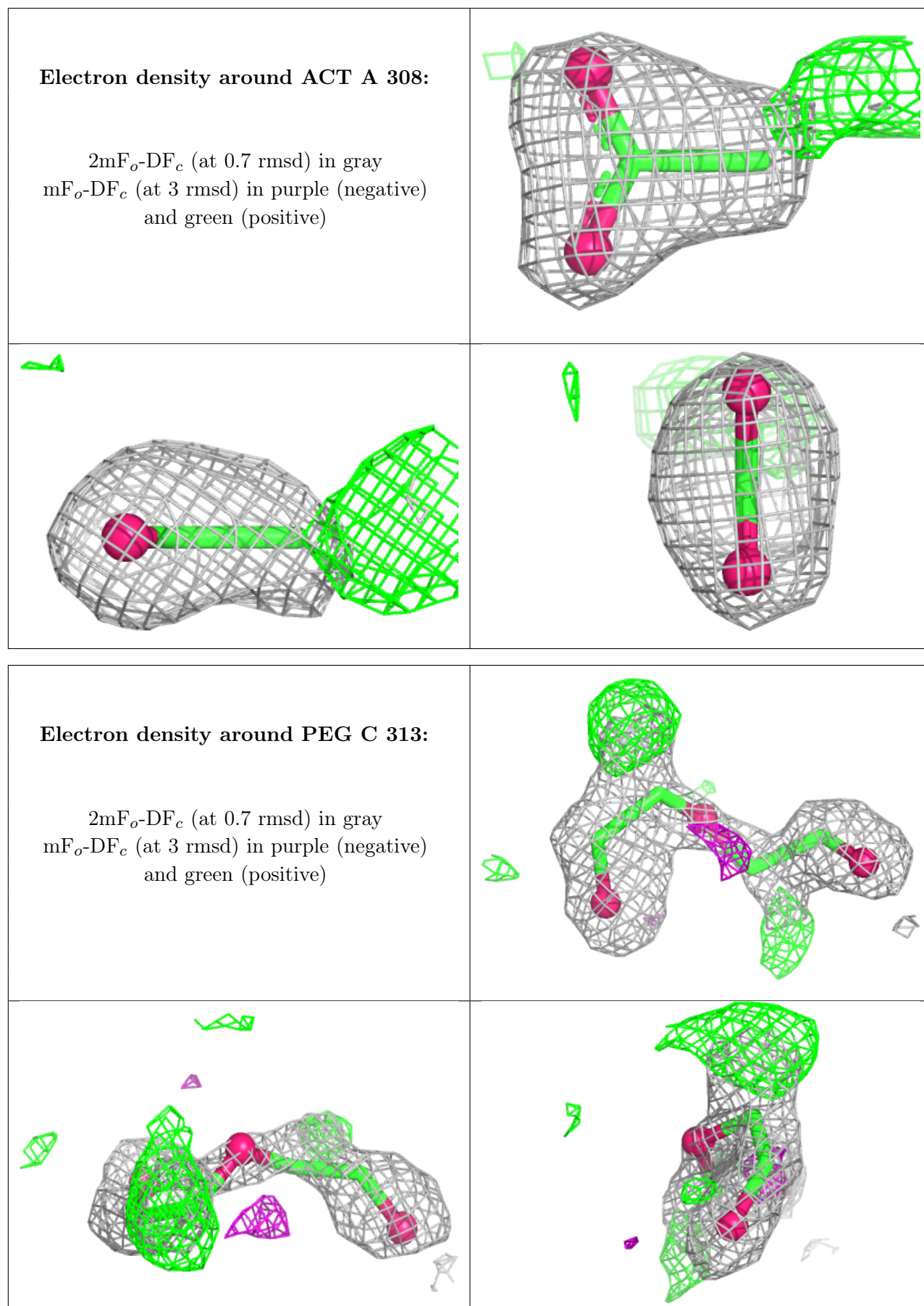


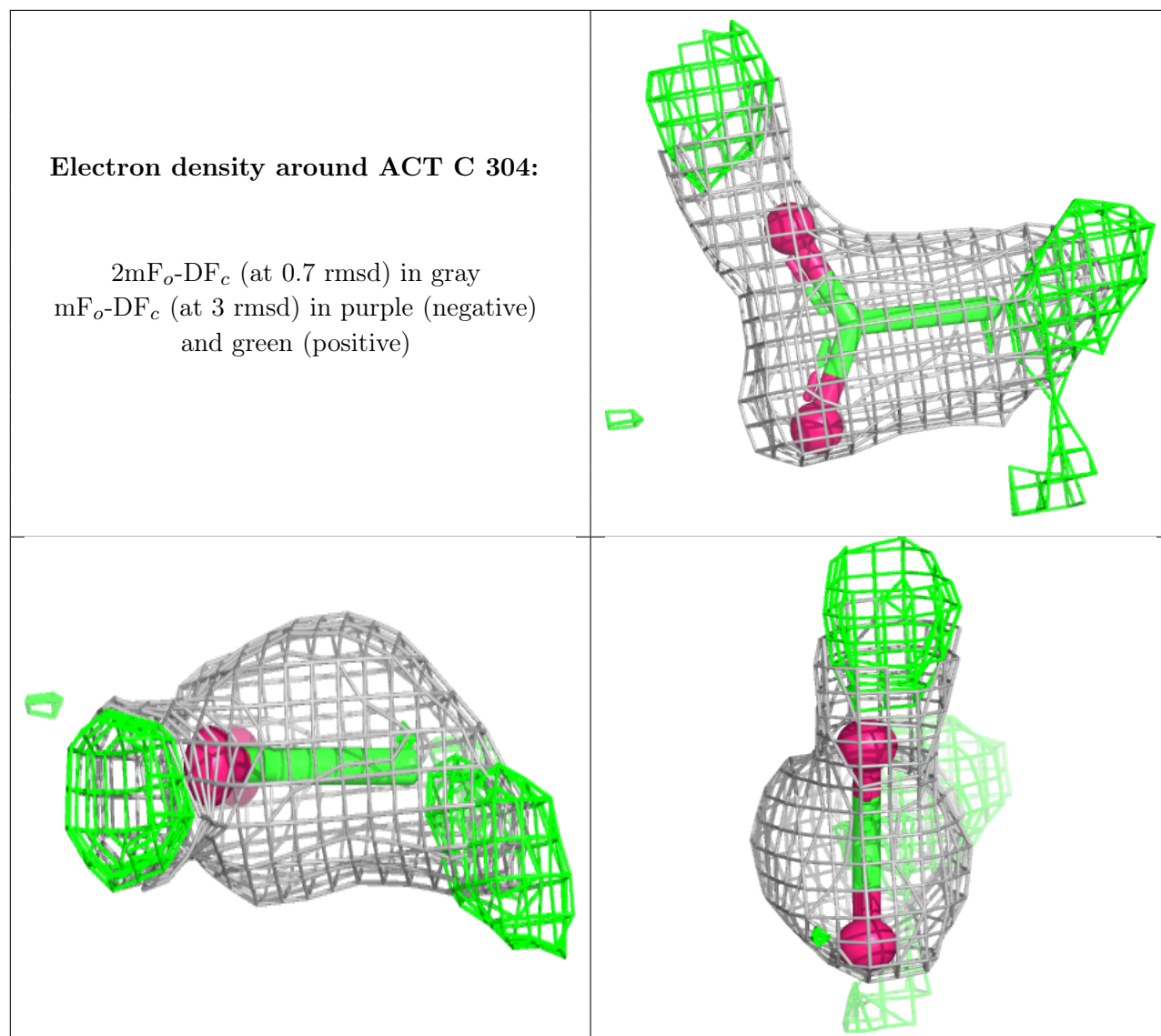
**Electron density around EDO F 307:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



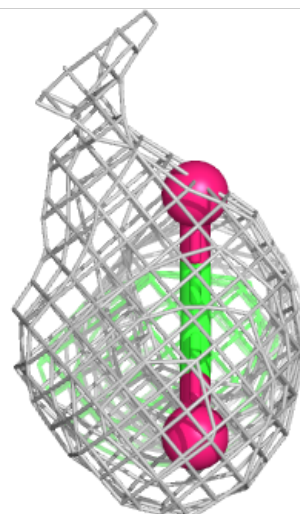
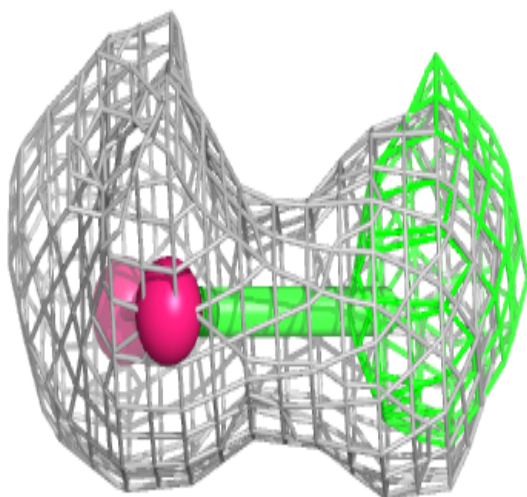
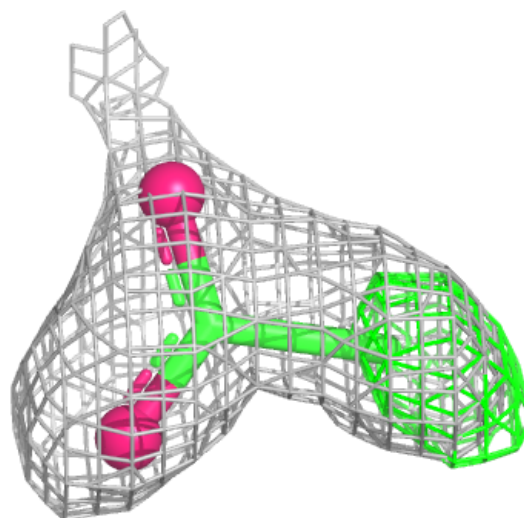


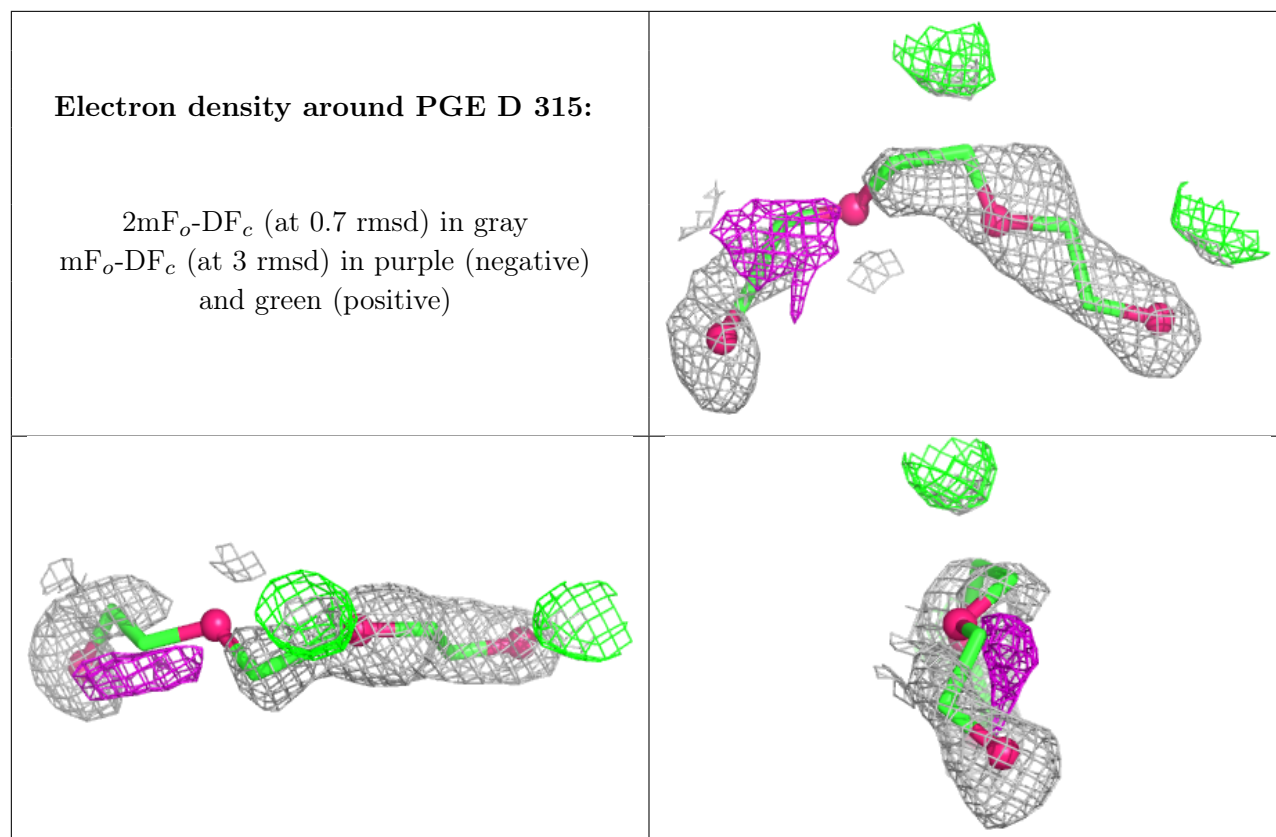


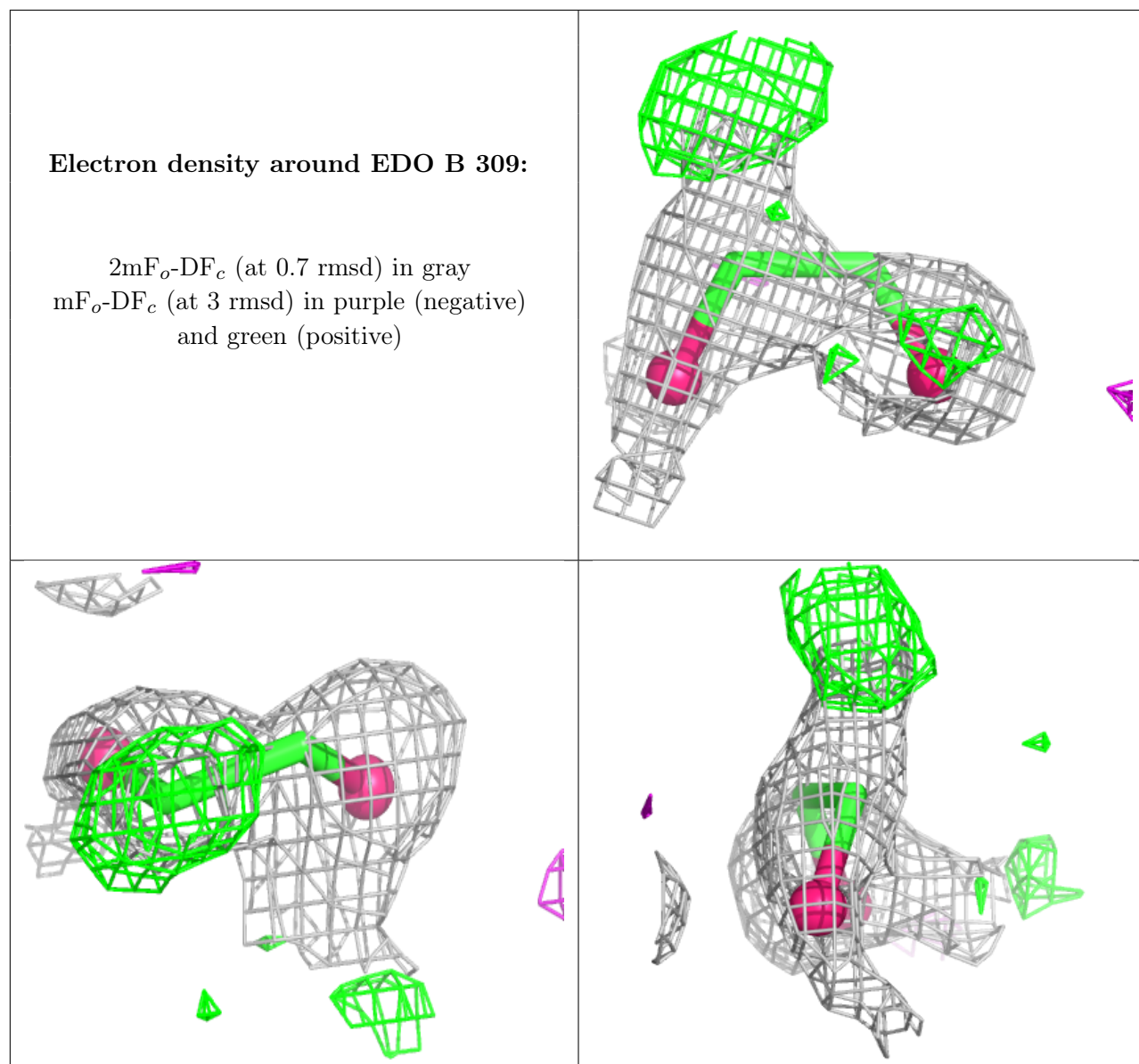


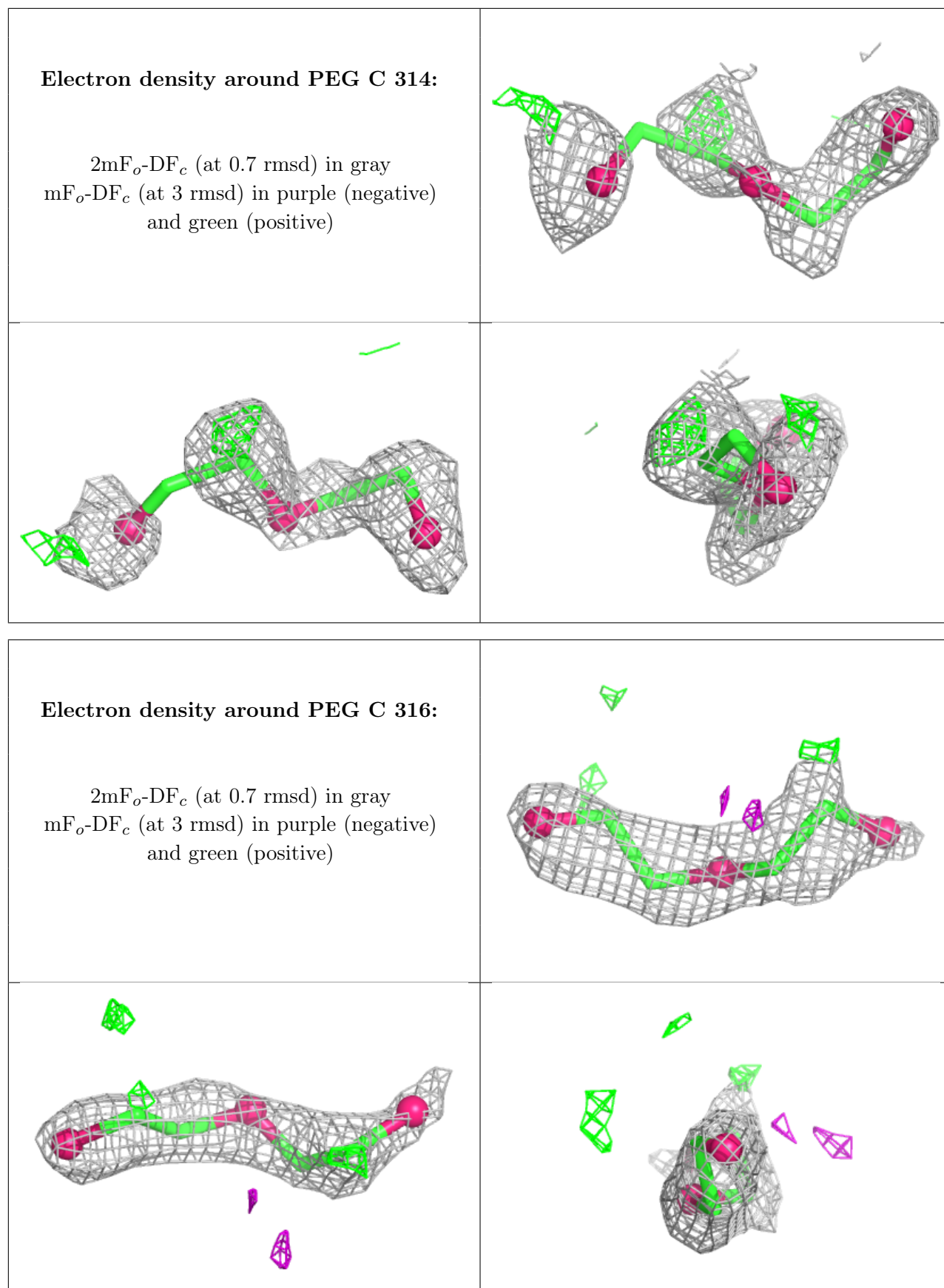
**Electron density around ACT E 305:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



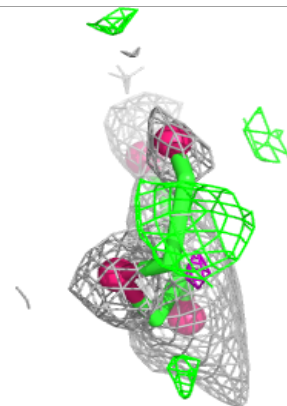
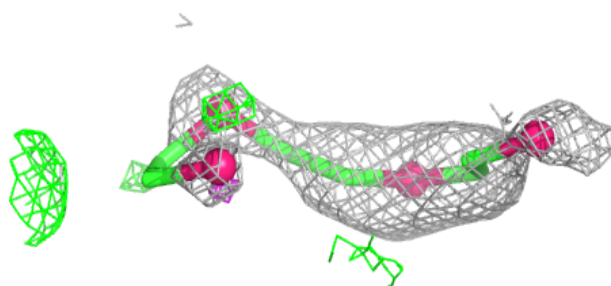
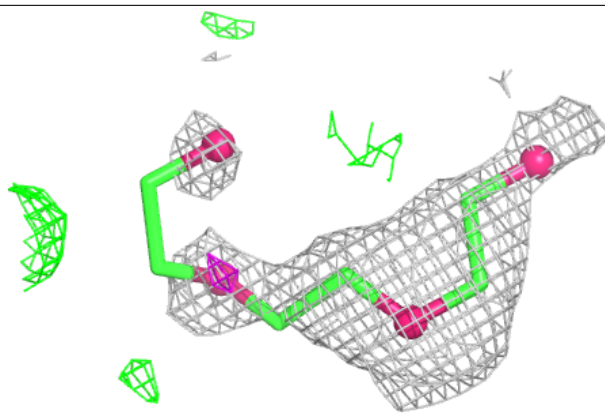




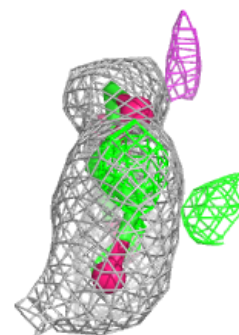
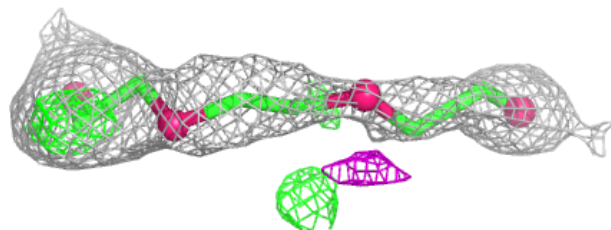
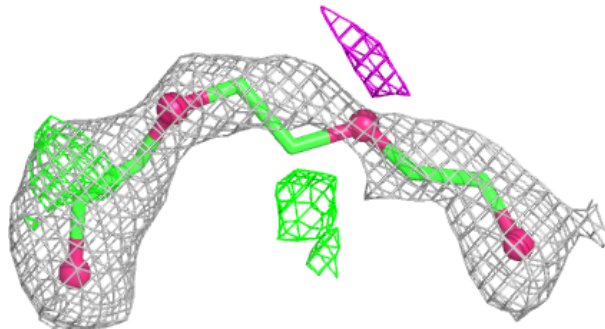


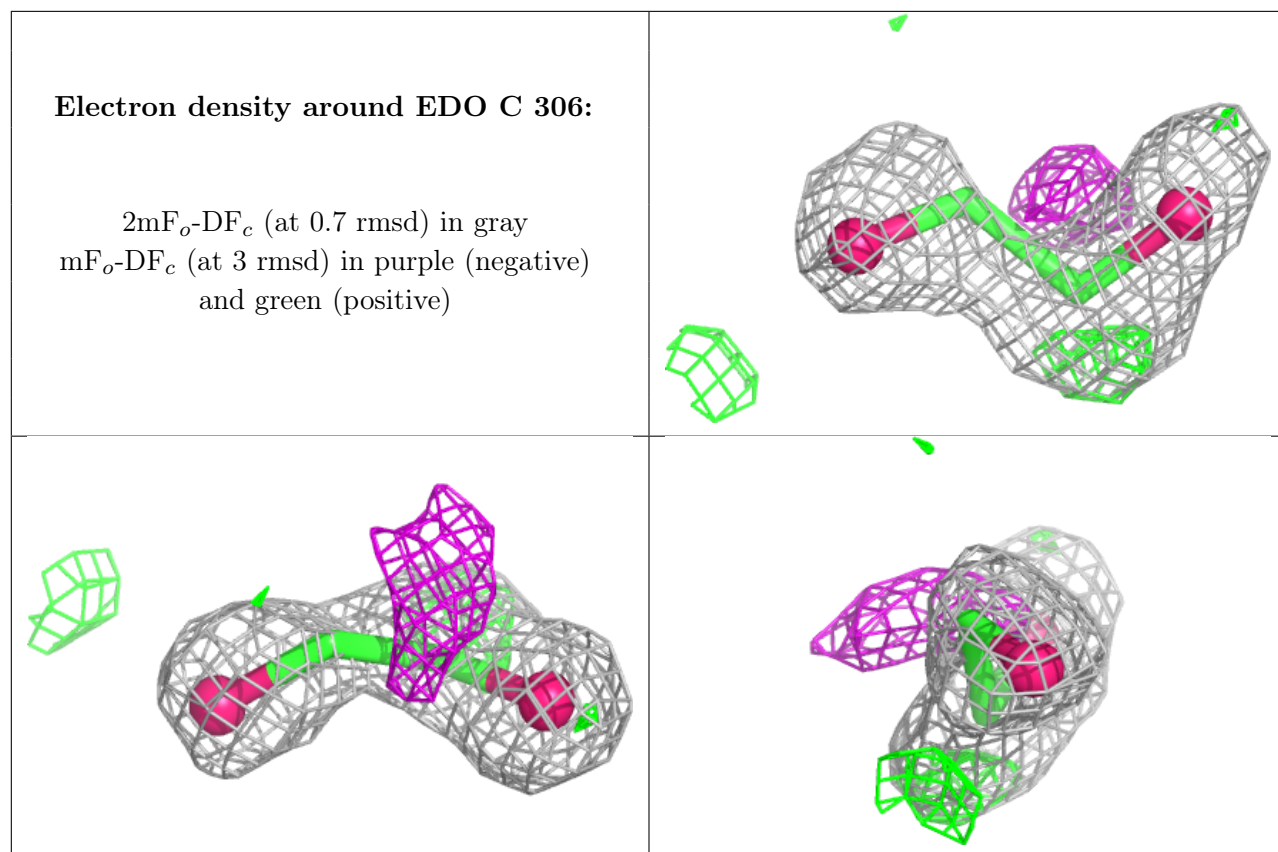
**Electron density around PGE F 310:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**Electron density around PGE D 314:**

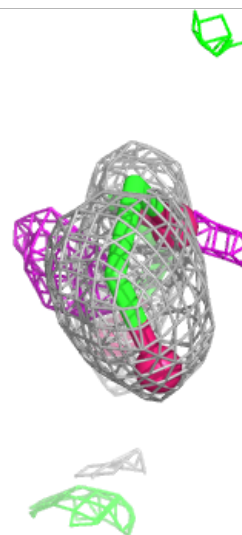
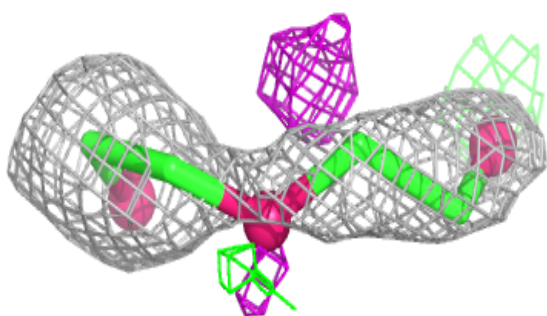
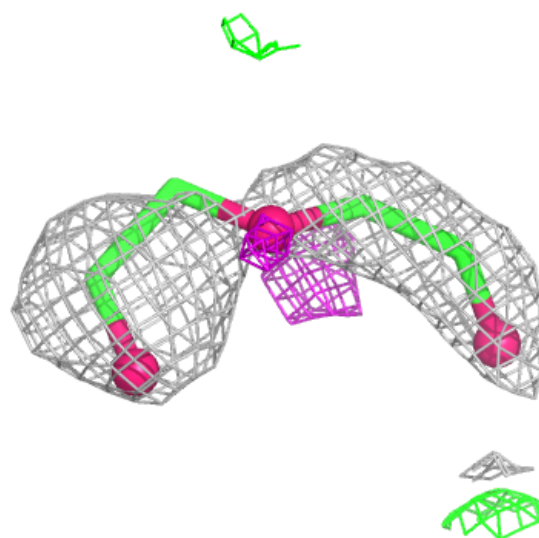
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

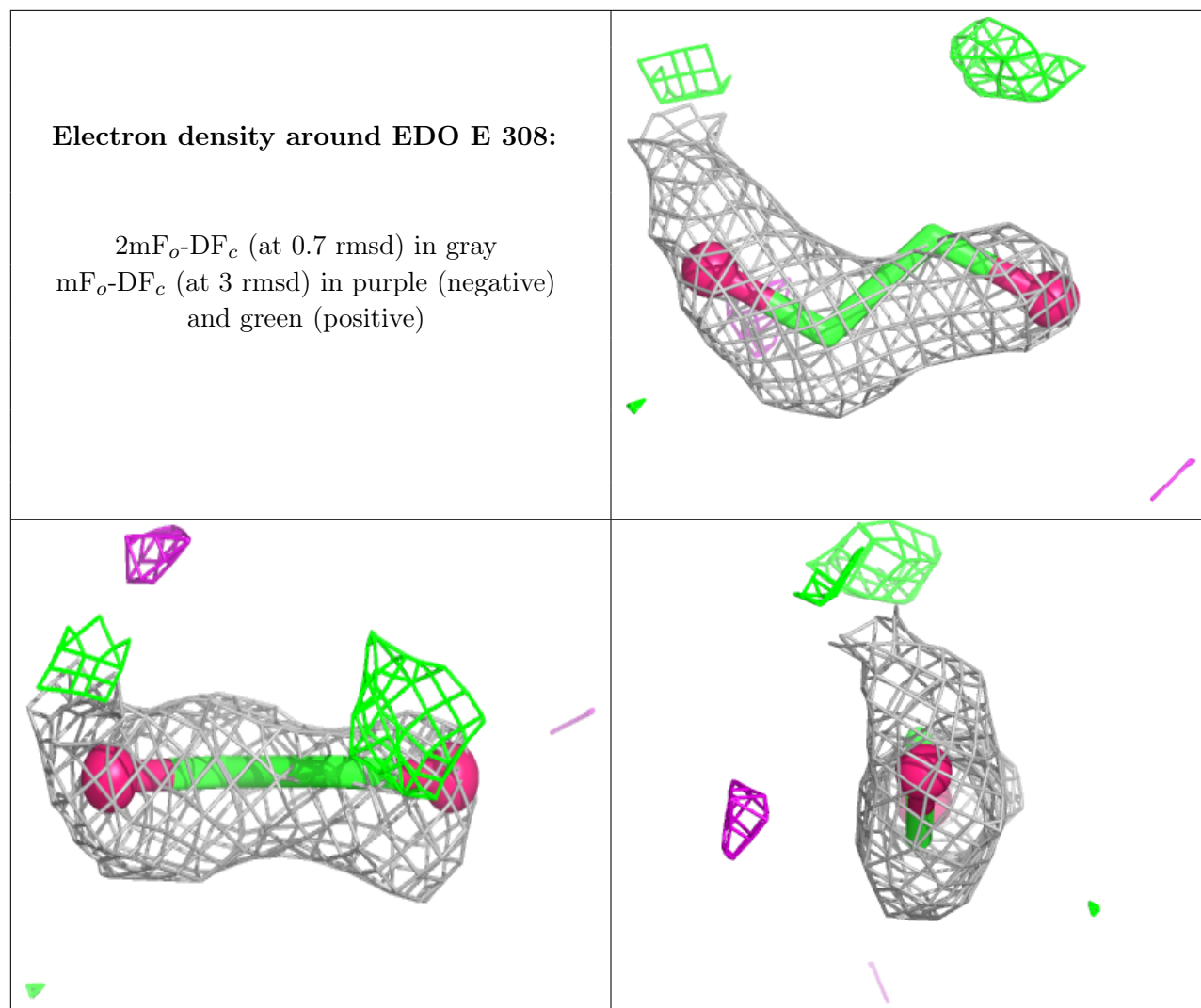


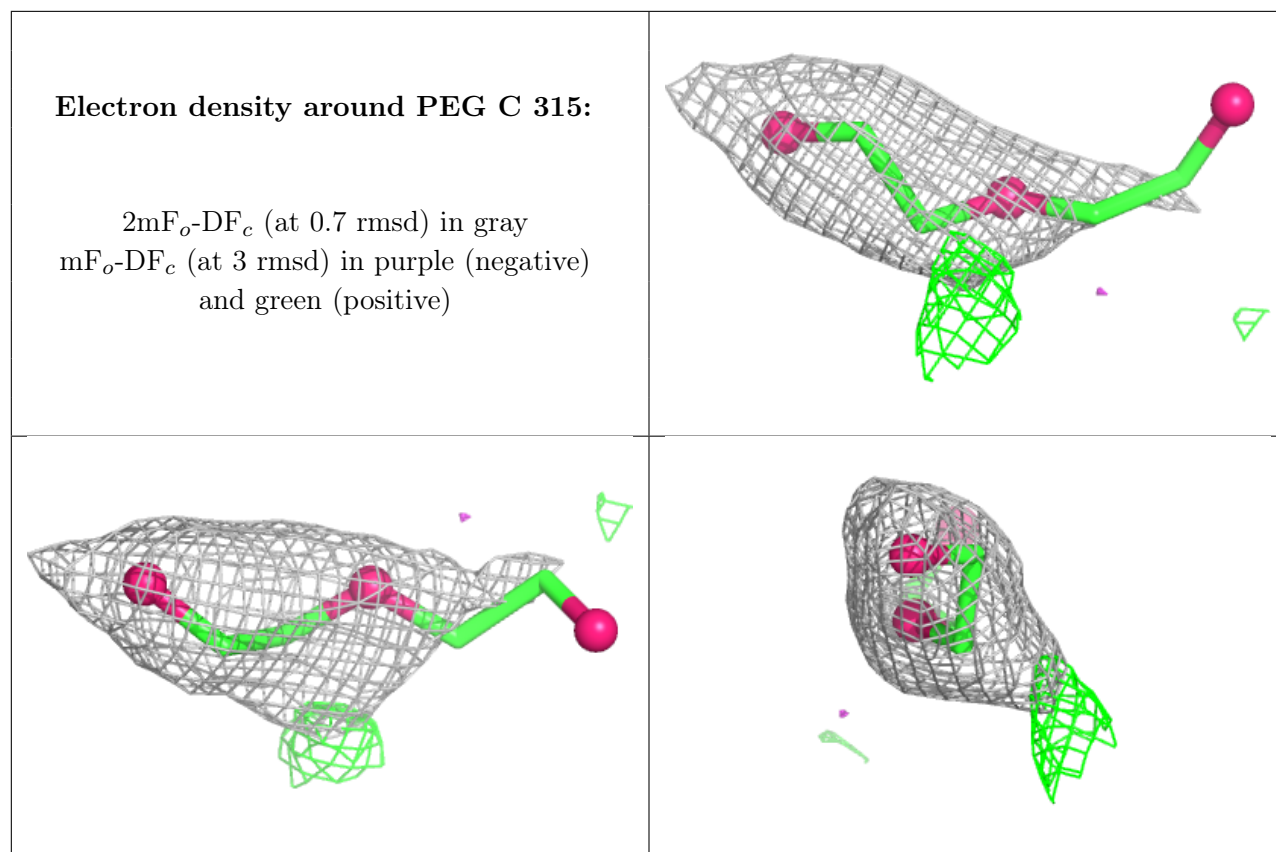


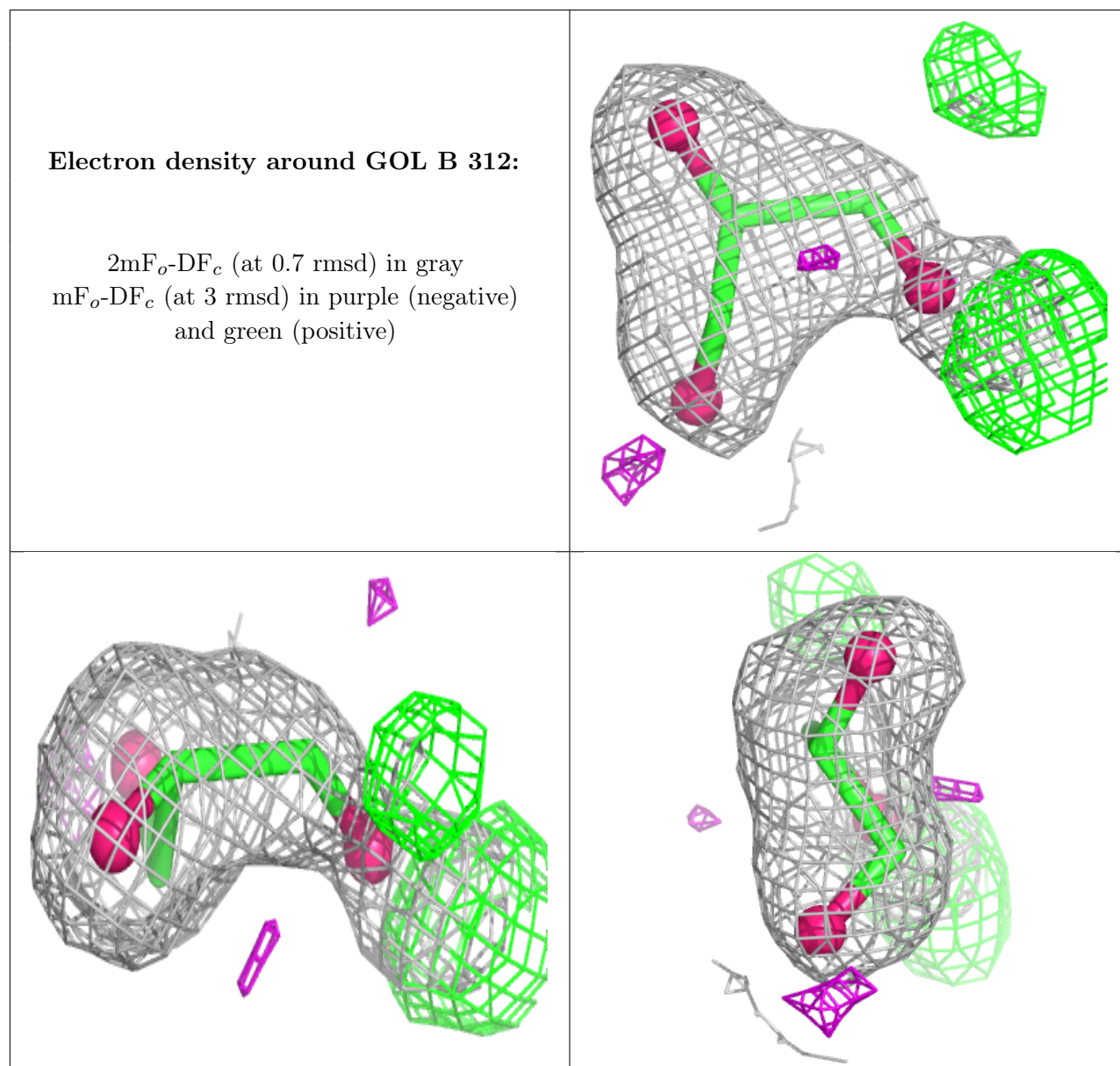
**Electron density around PEG F 313:**

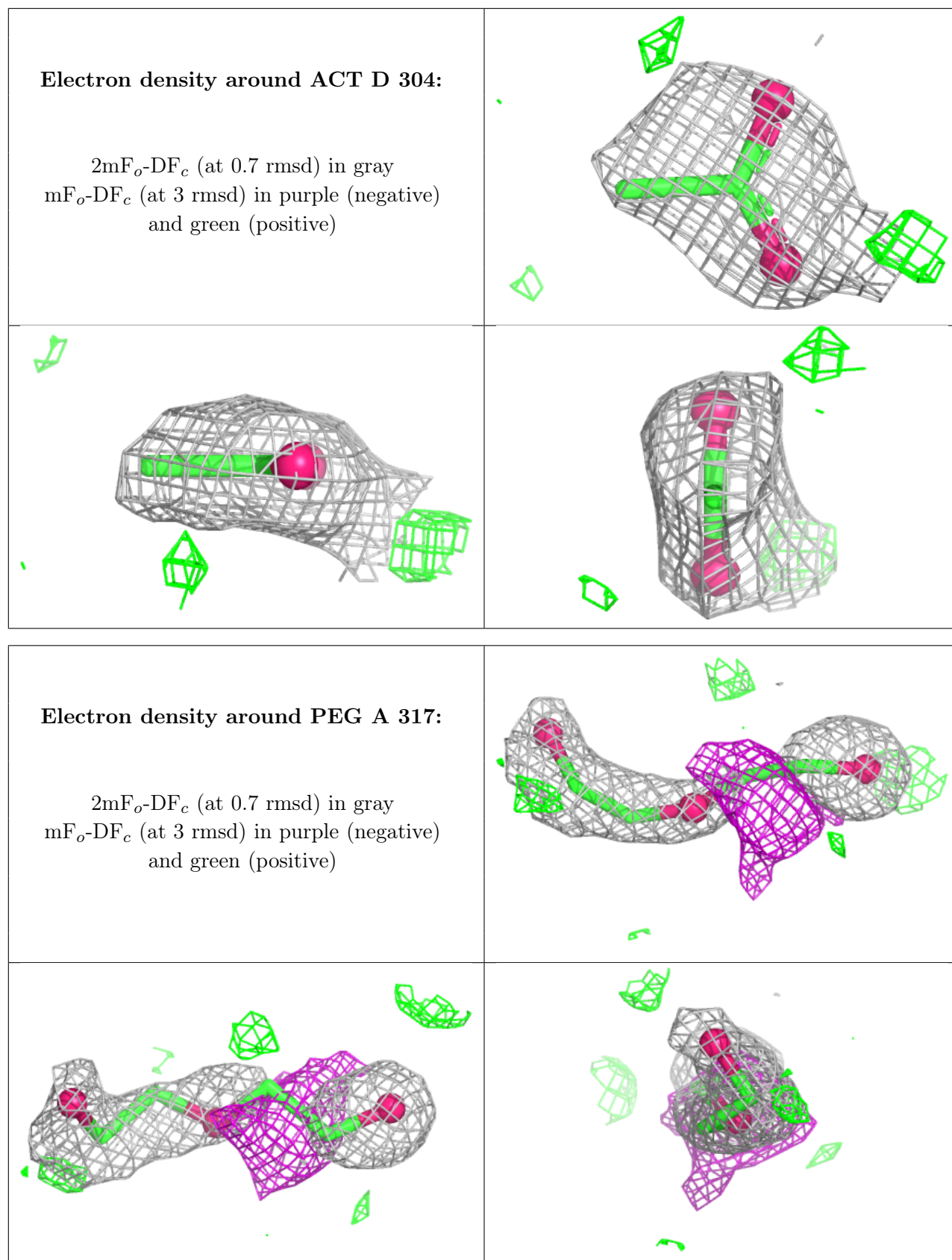
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





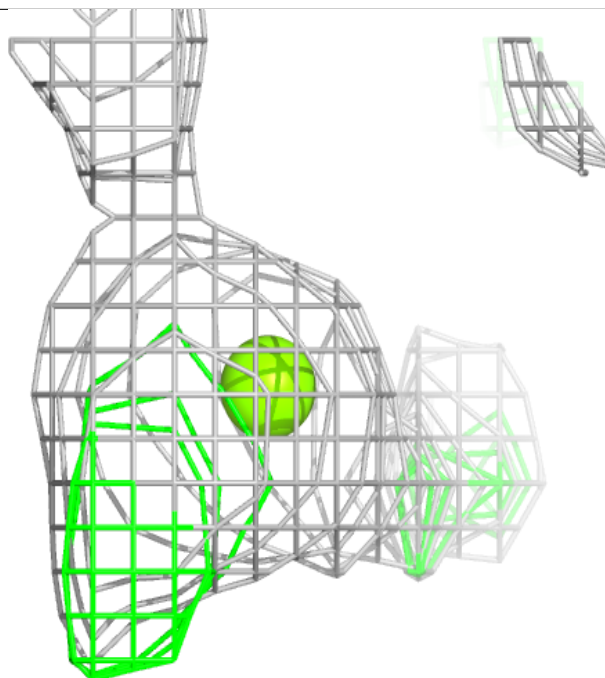
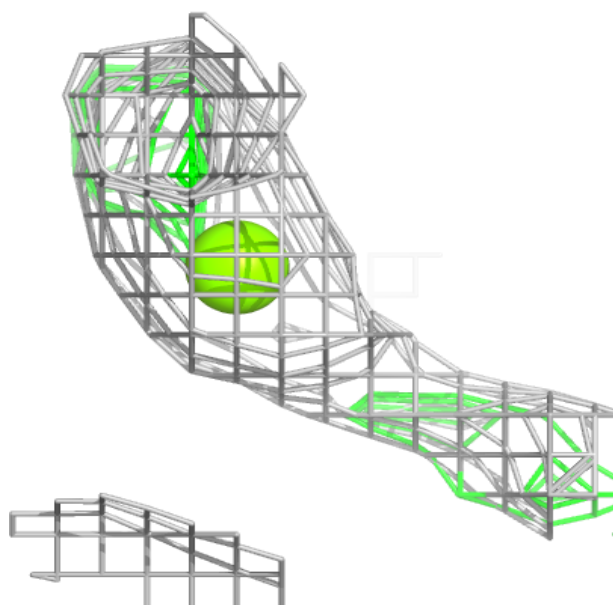
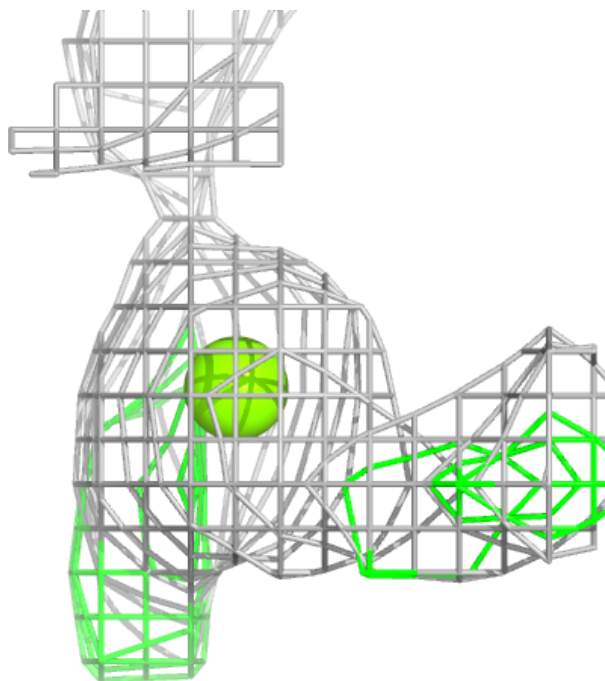


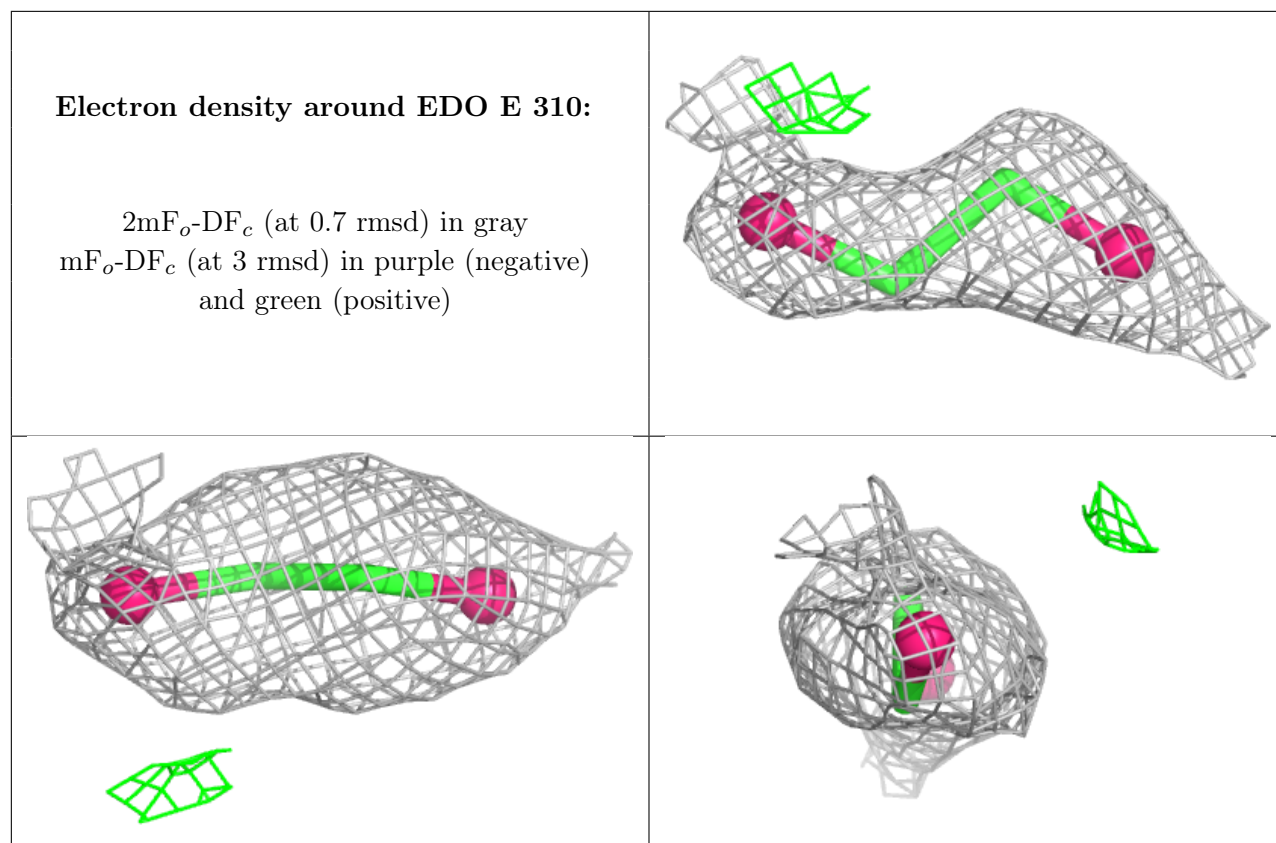


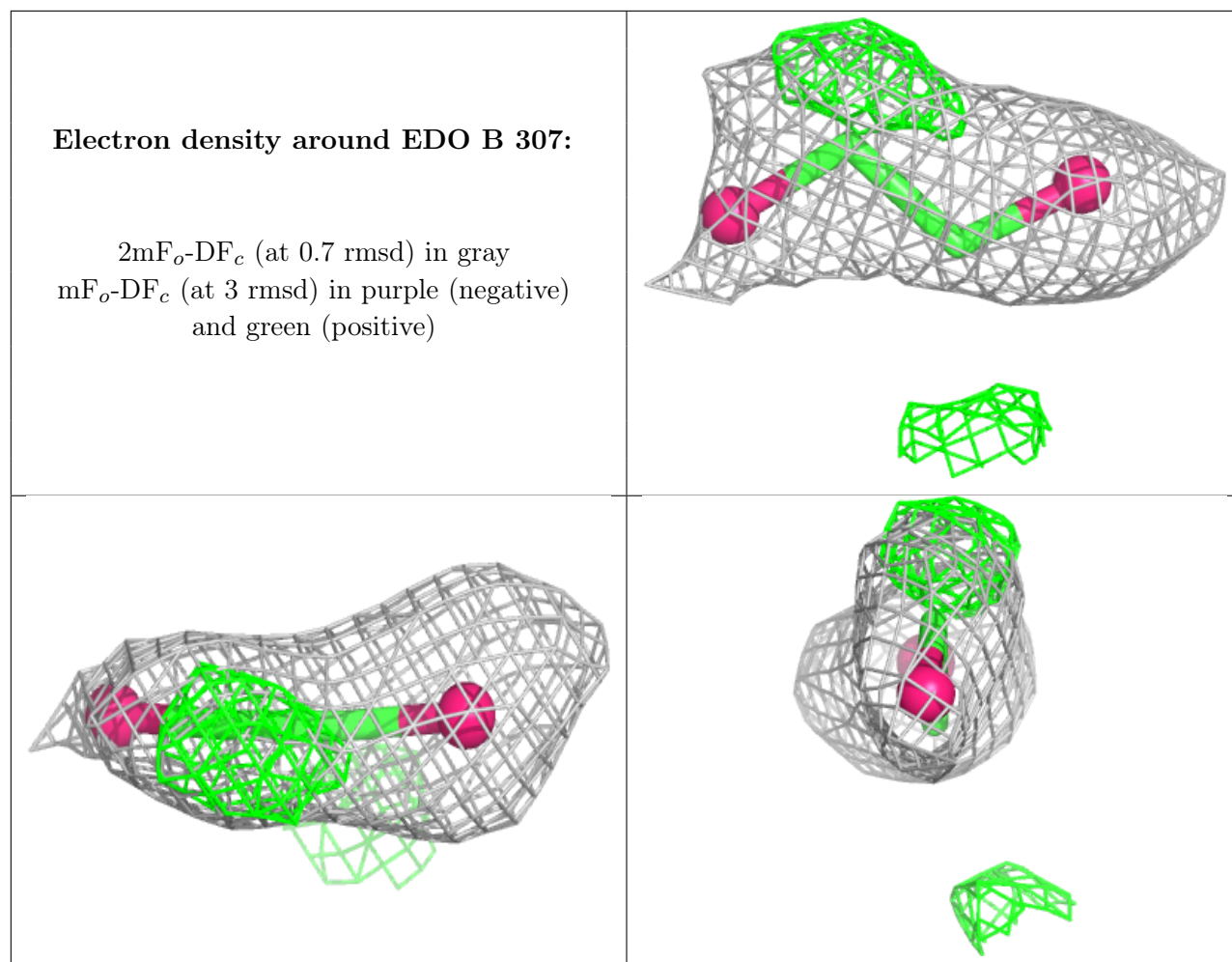


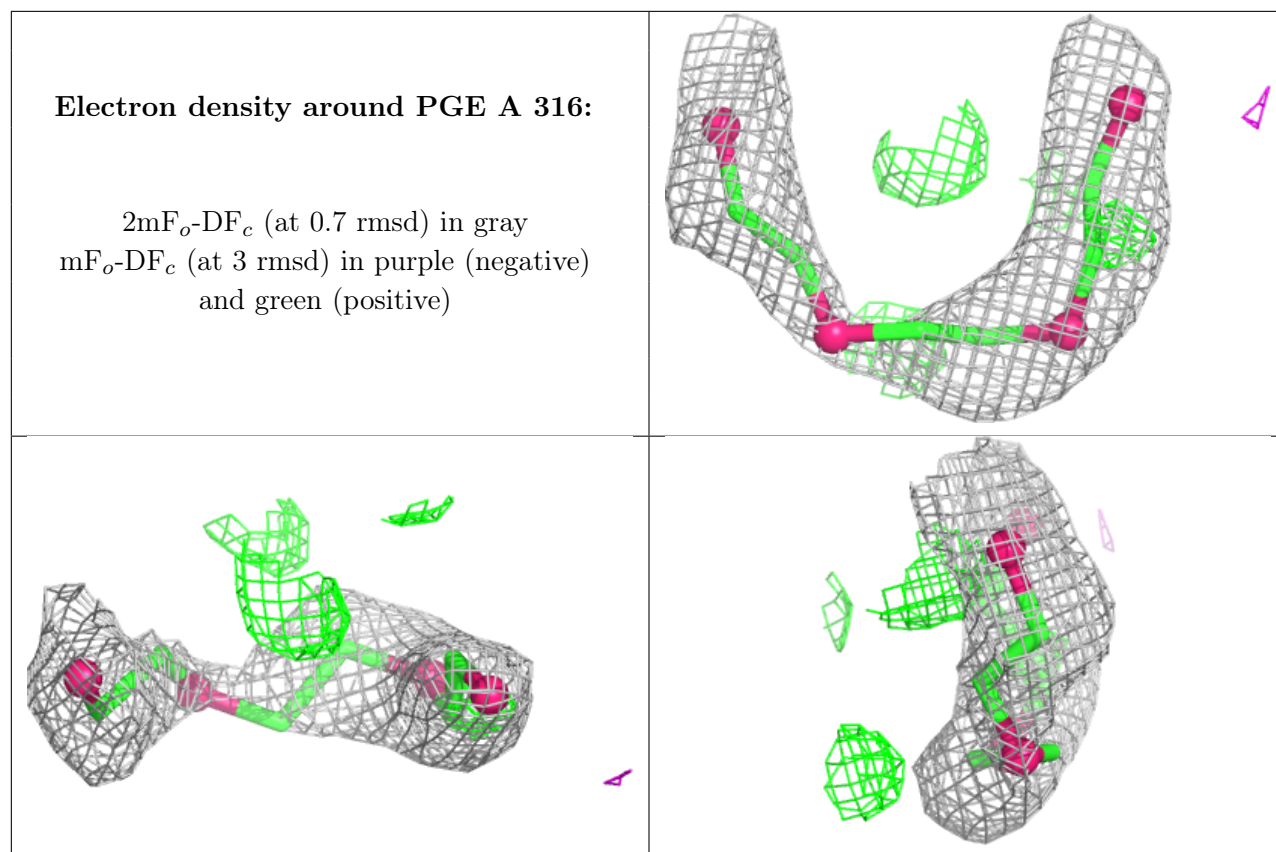
**Electron density around MG B 304:**

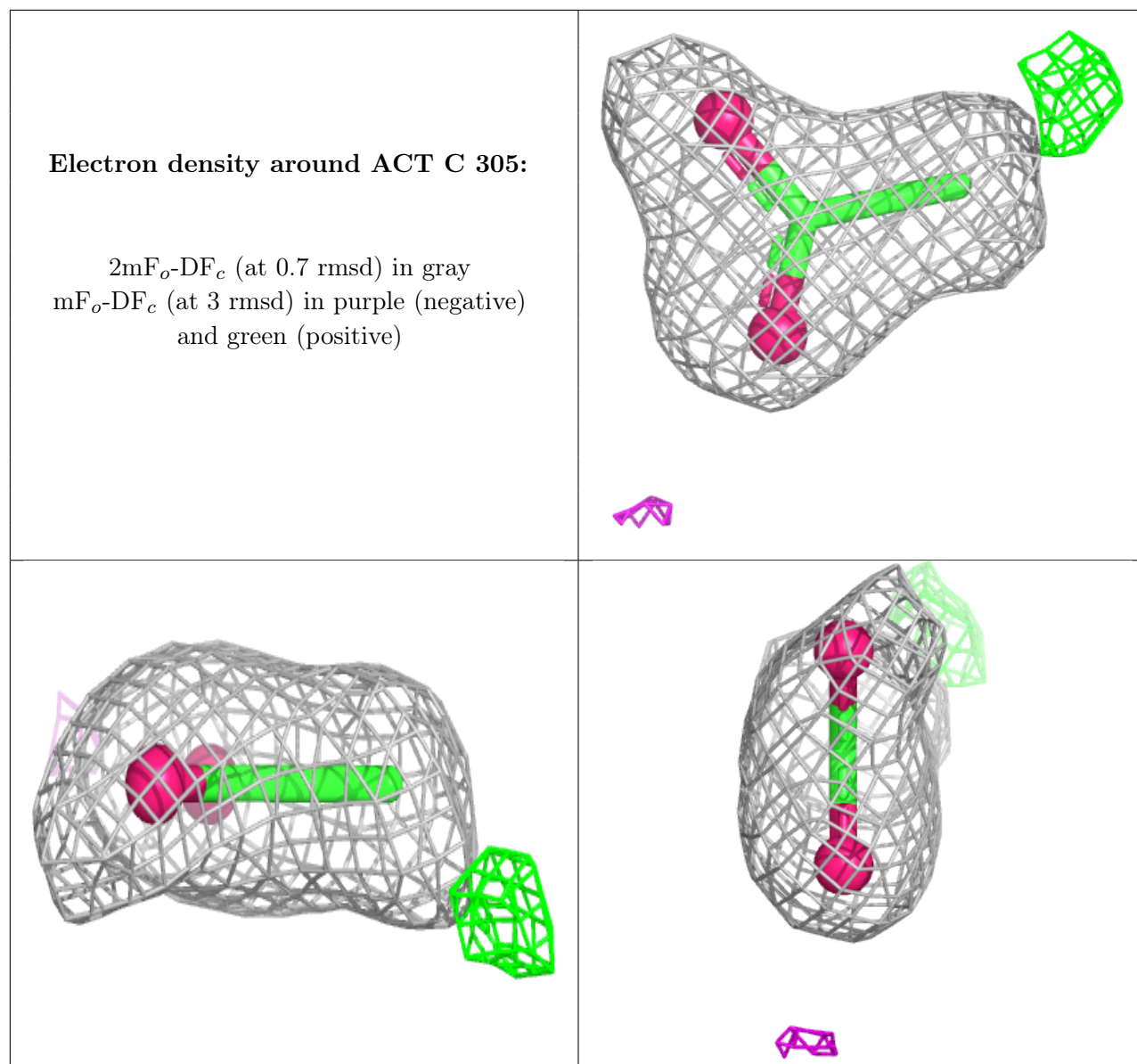
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

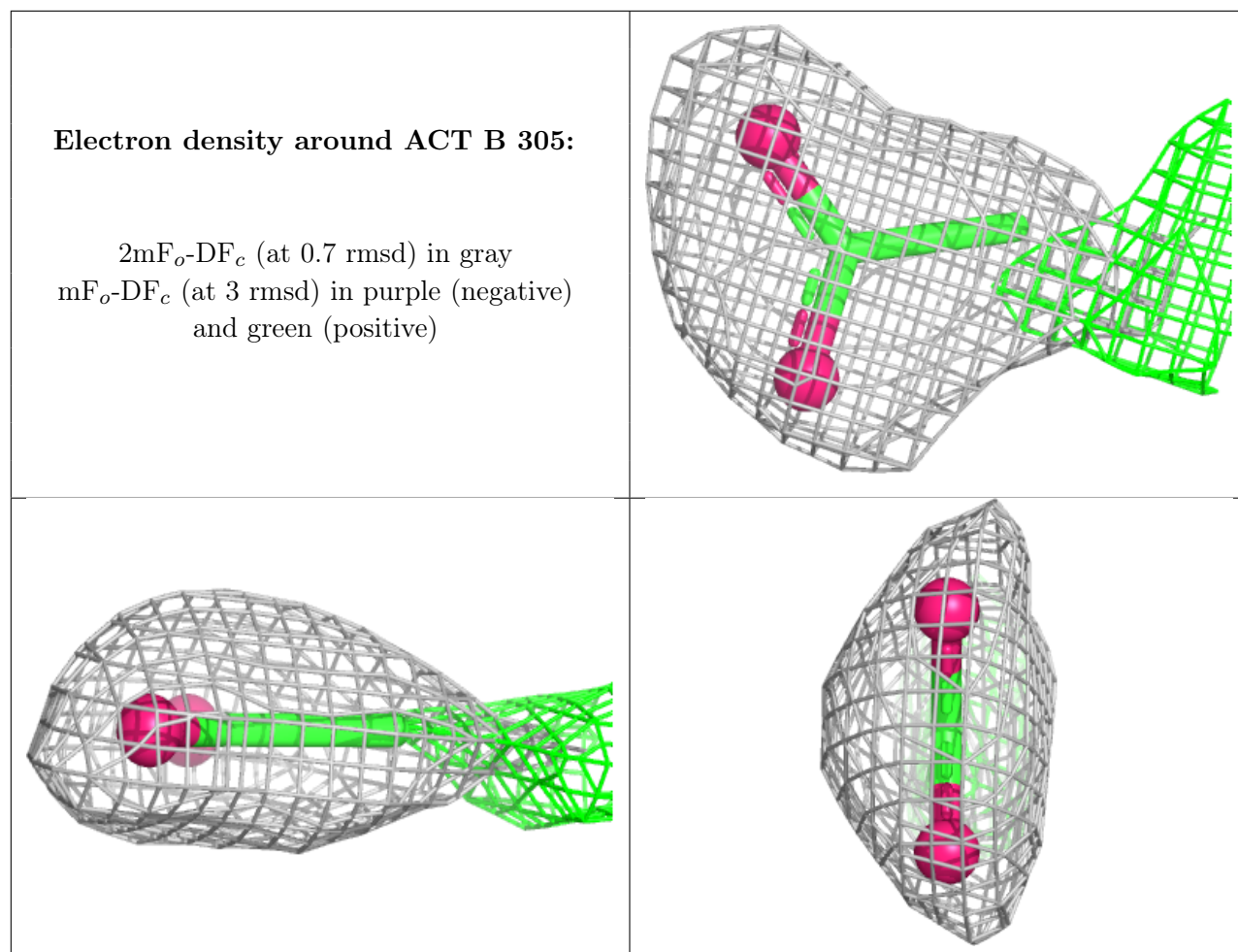






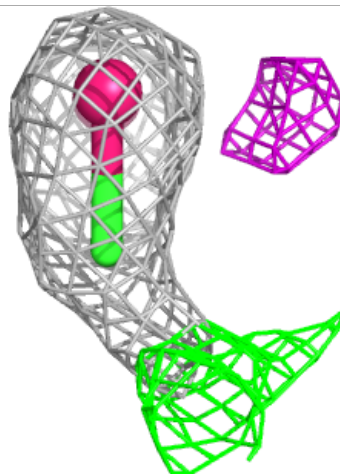
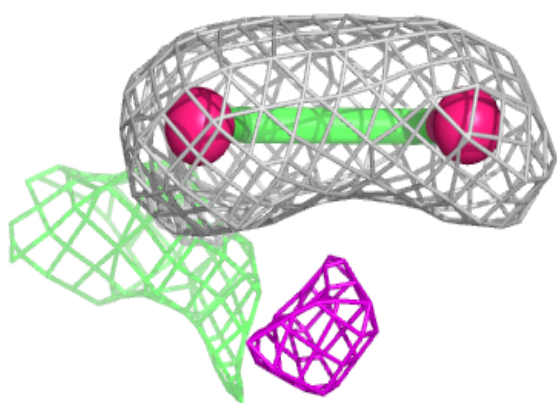
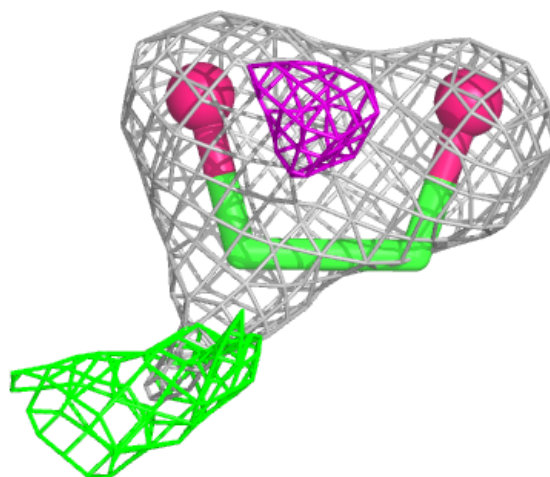


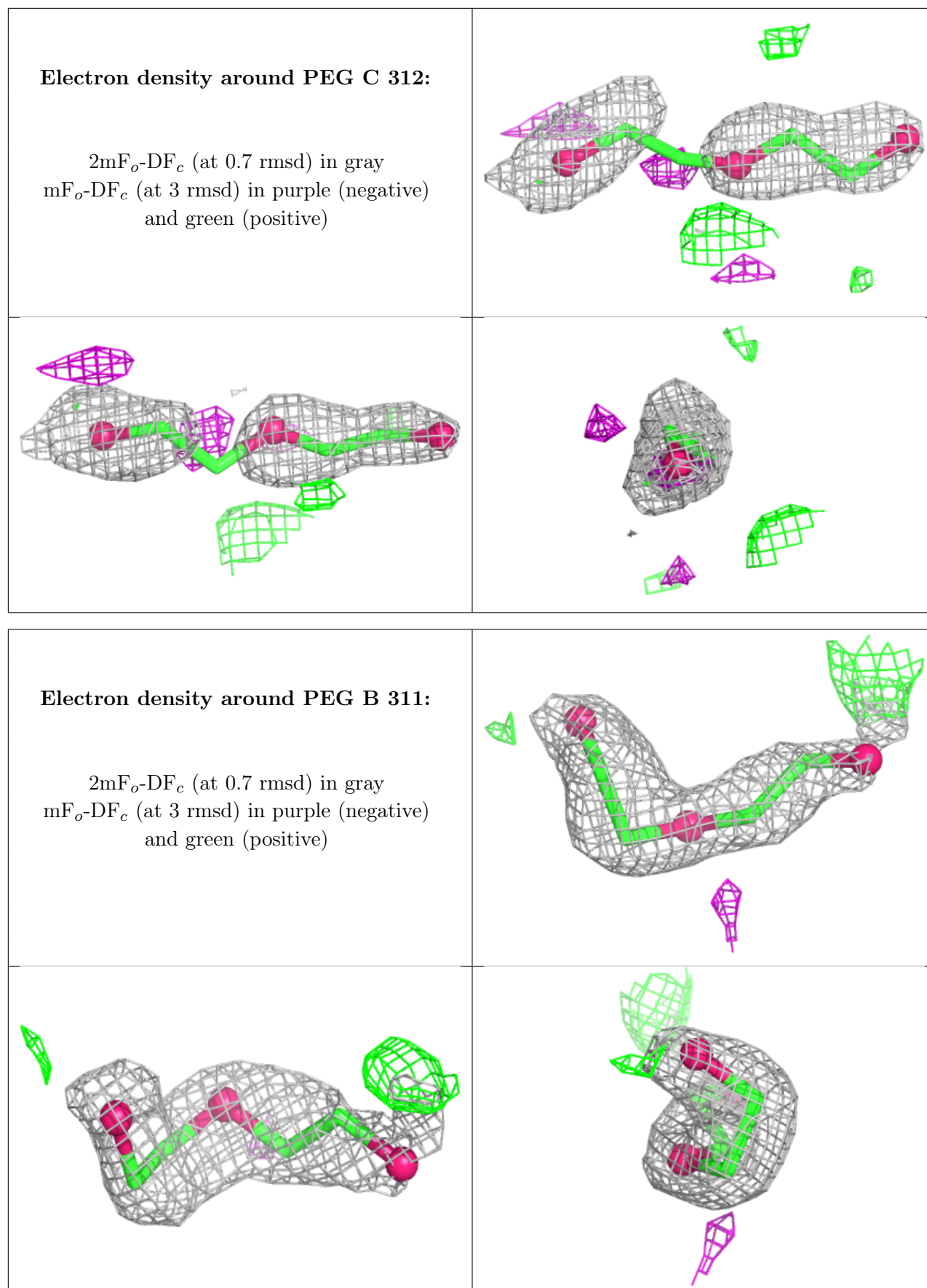


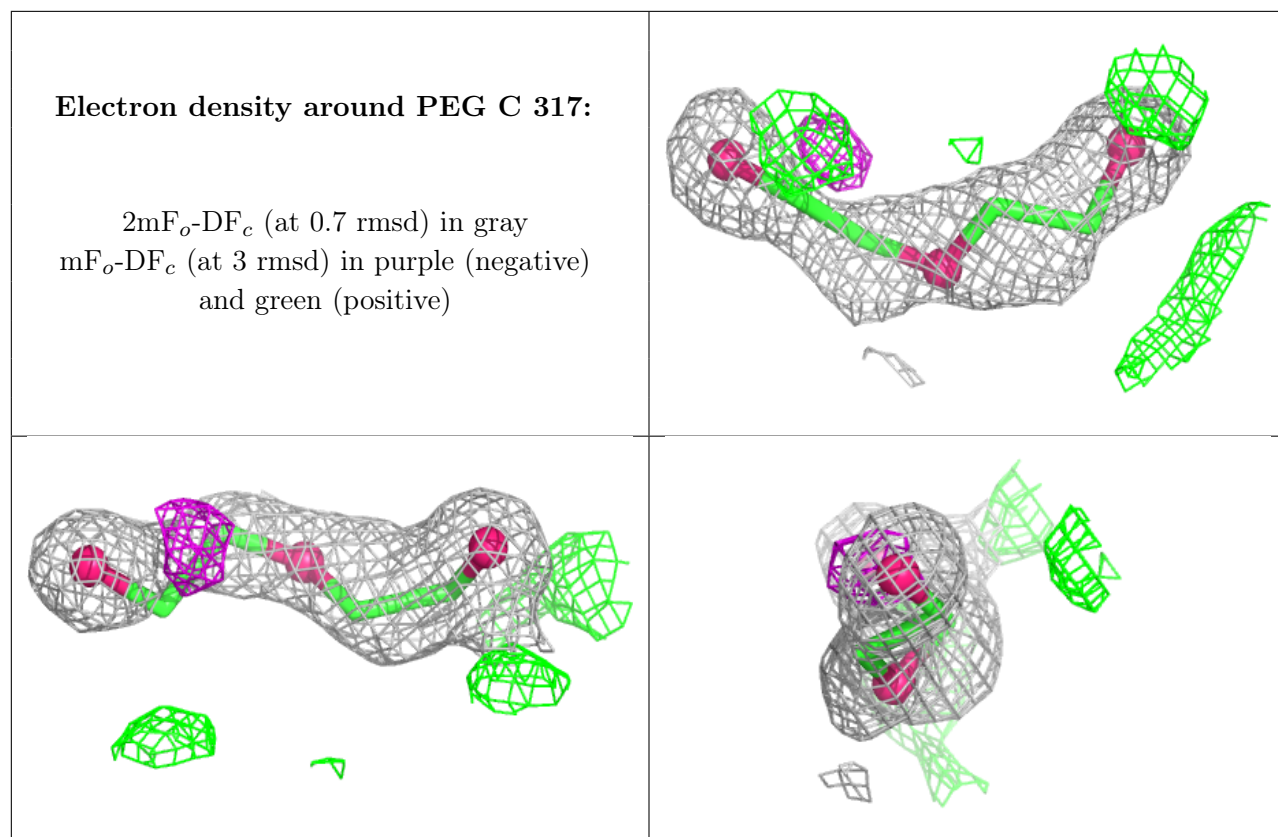


**Electron density around EDO E 307:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

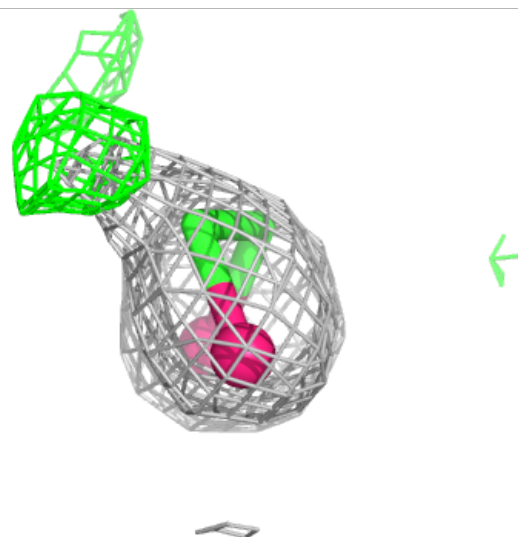
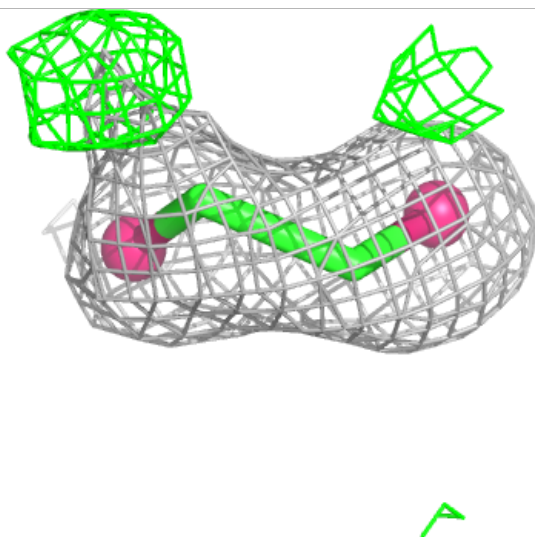
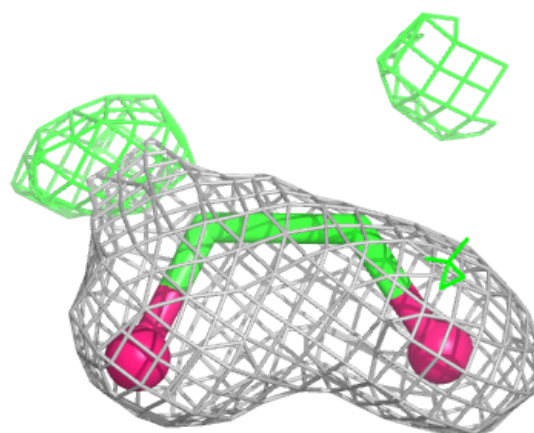


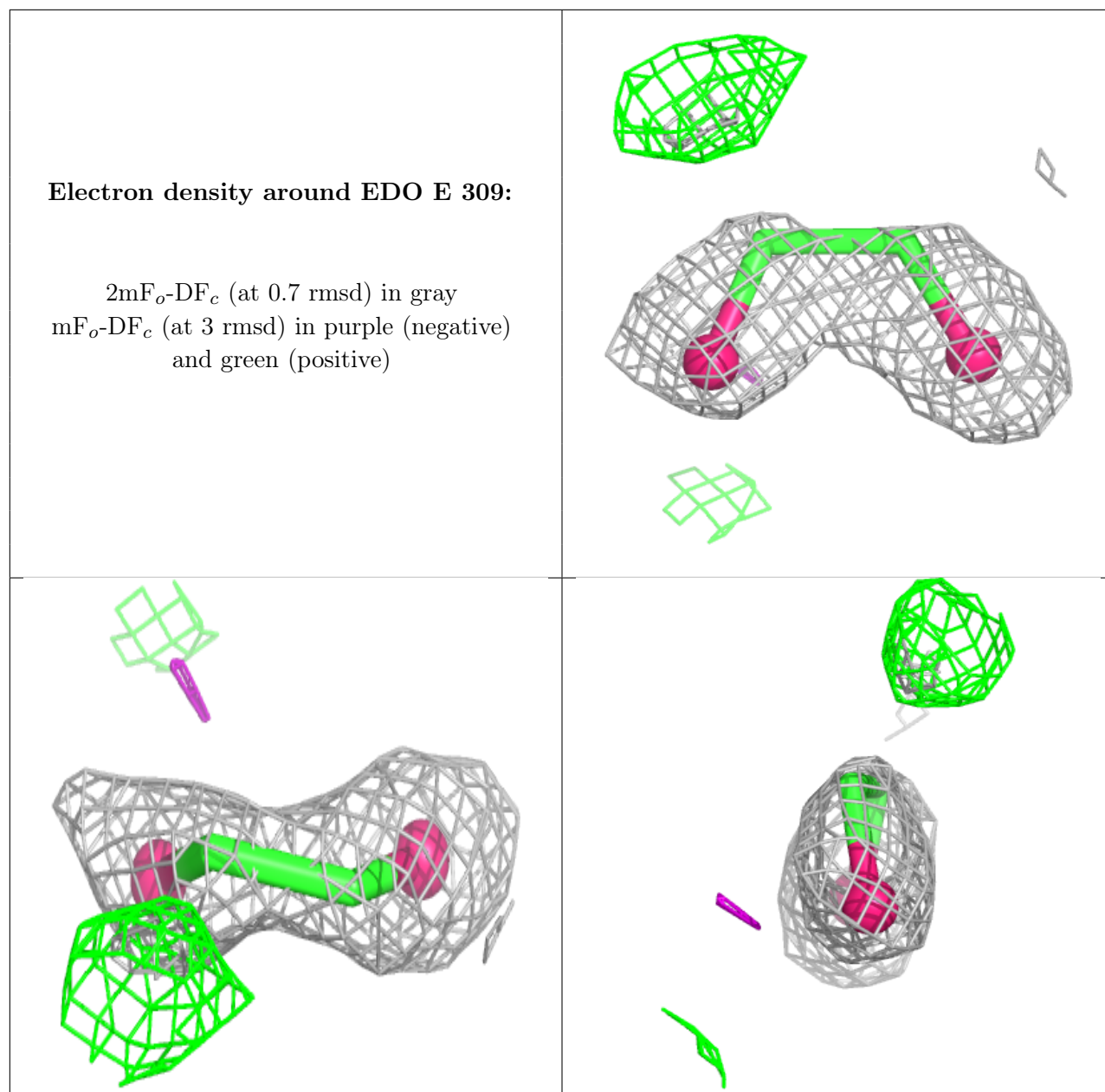


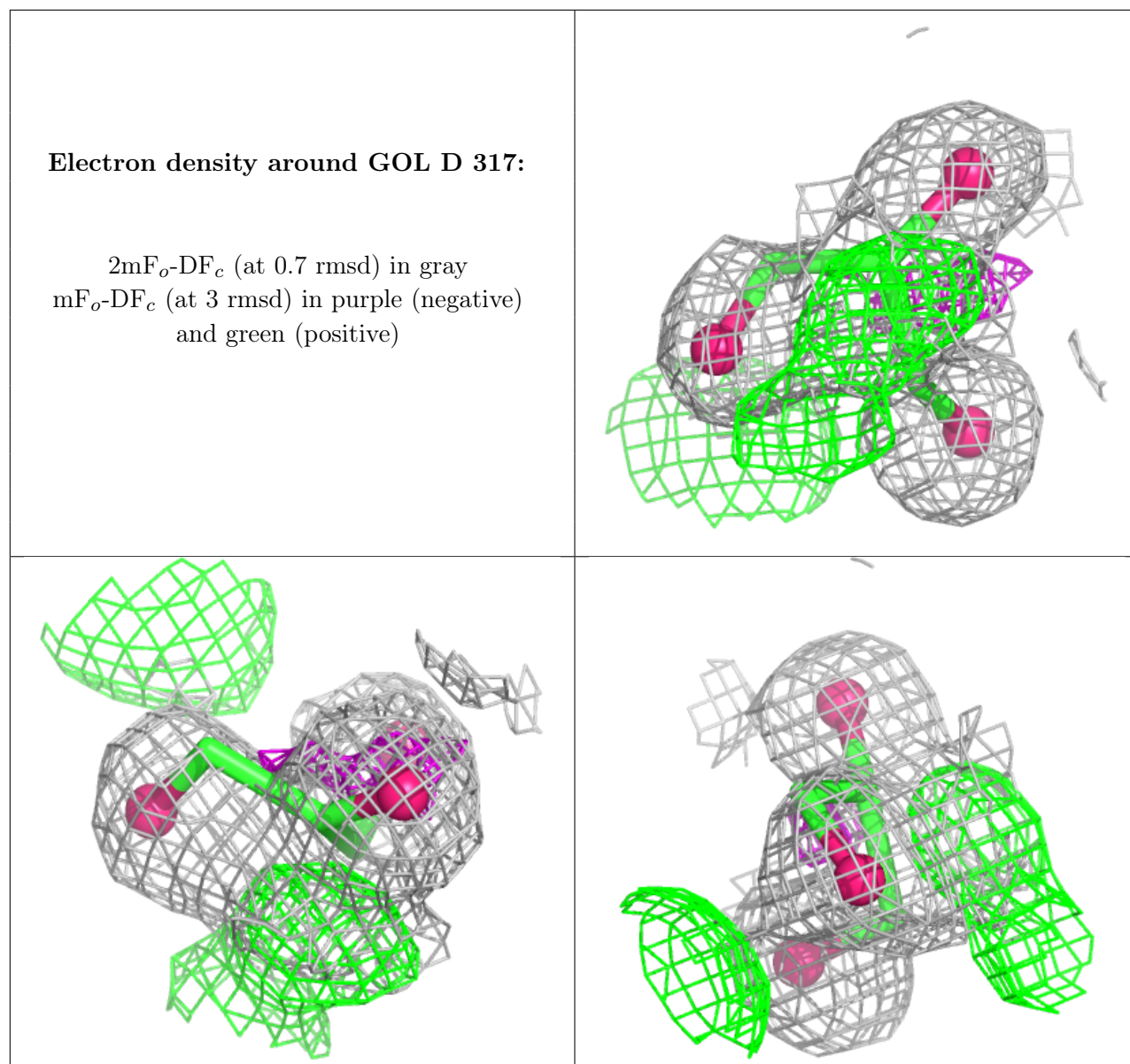


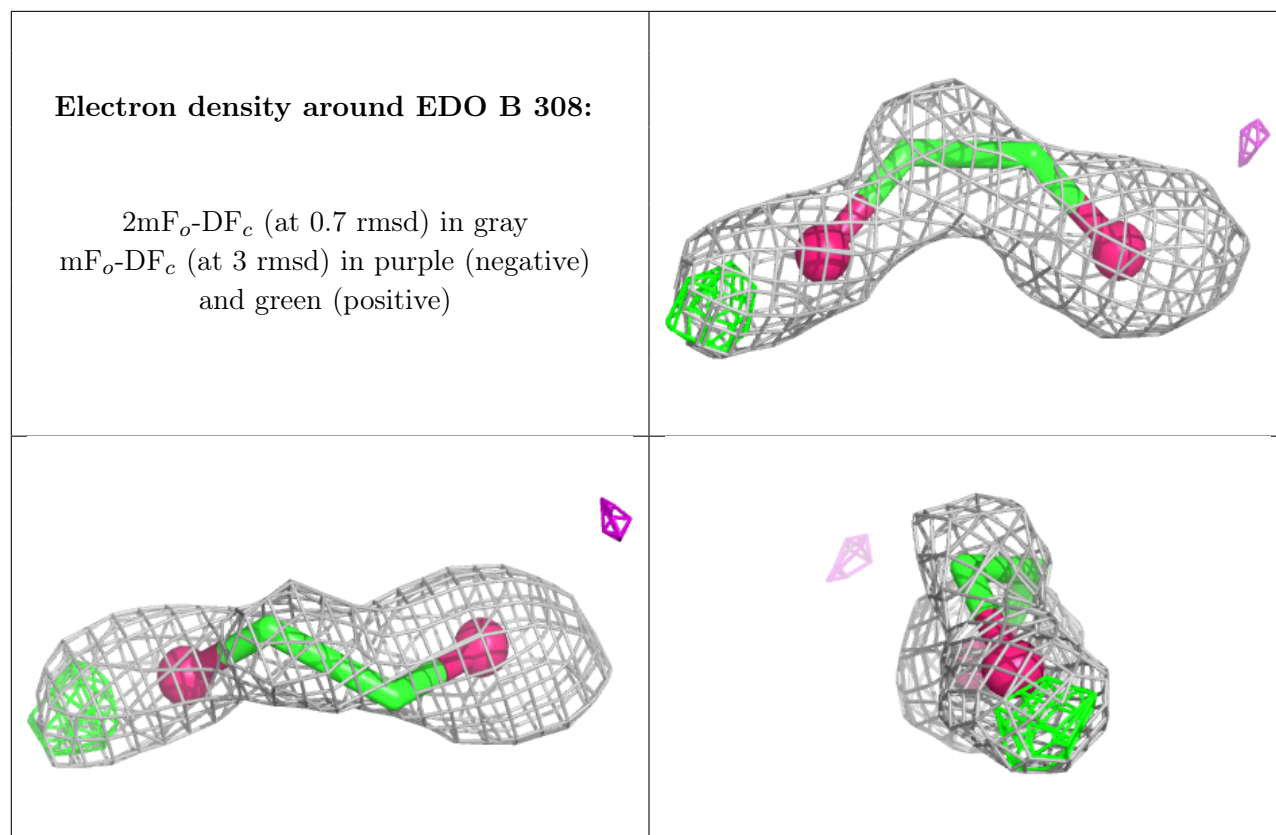
**Electron density around EDO F 308:**

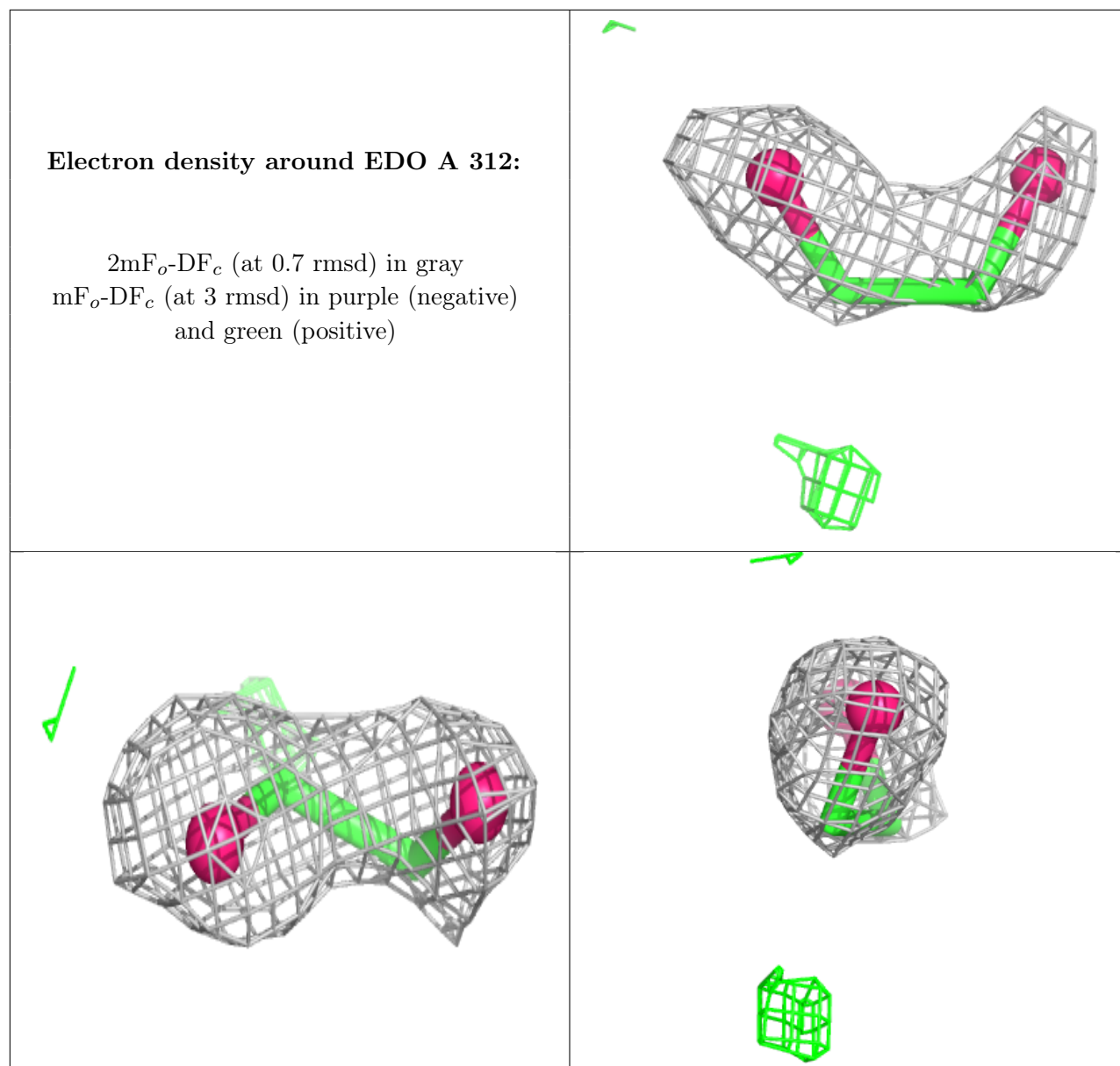
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

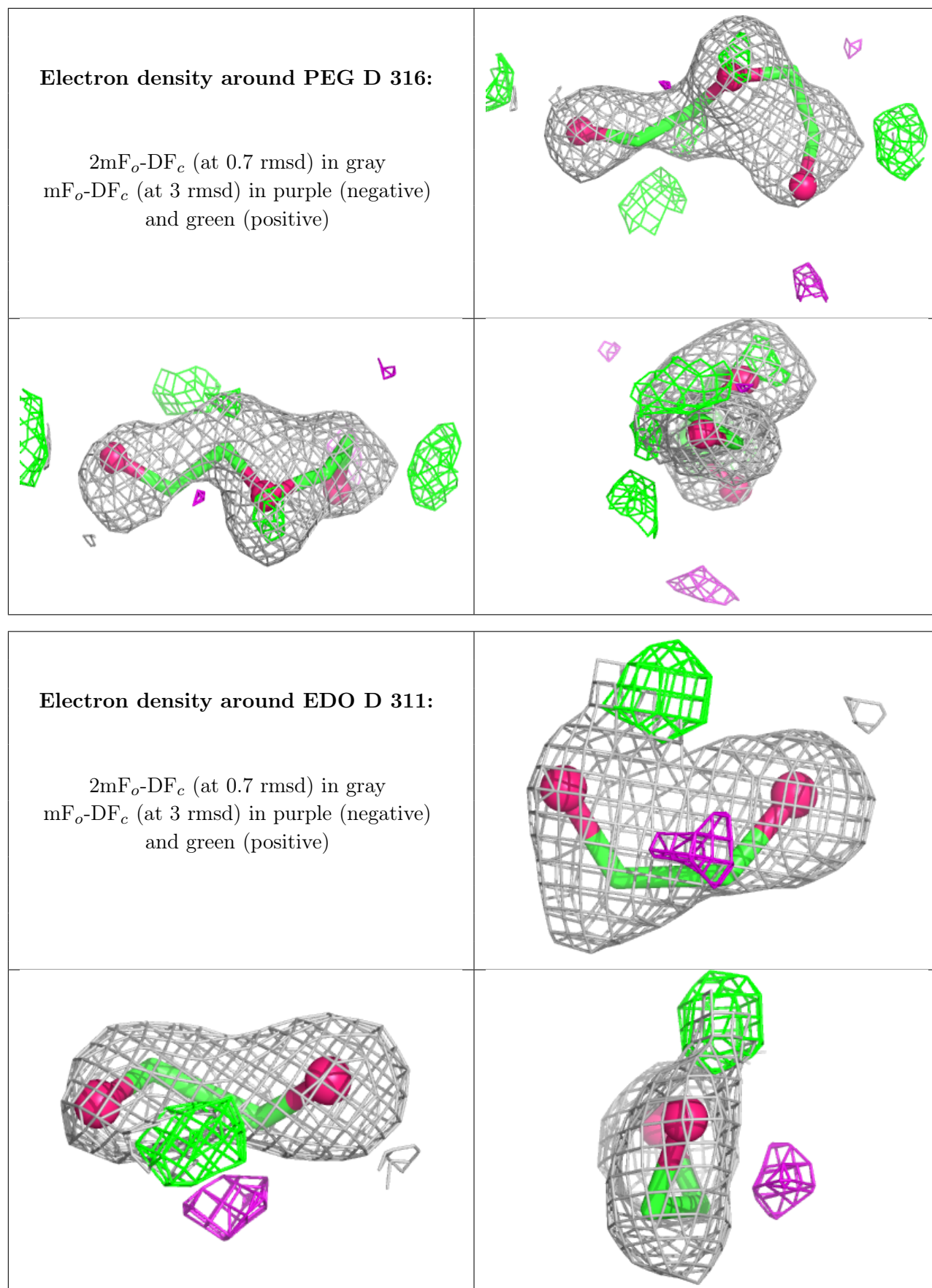






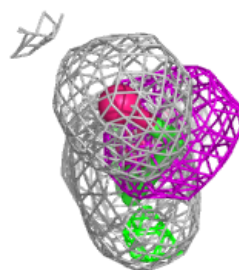
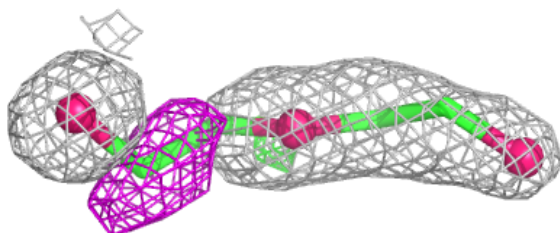
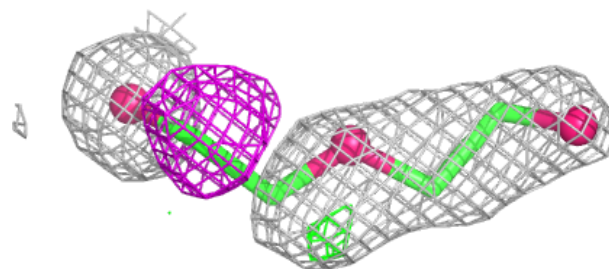




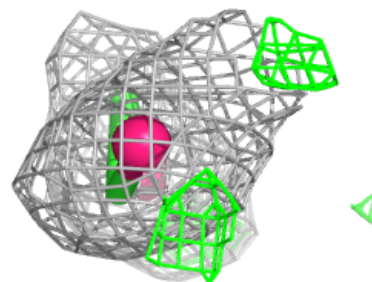
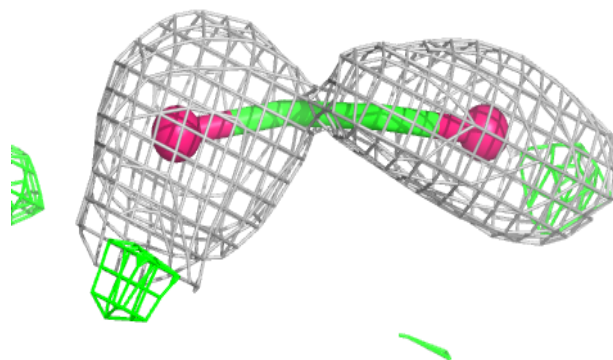
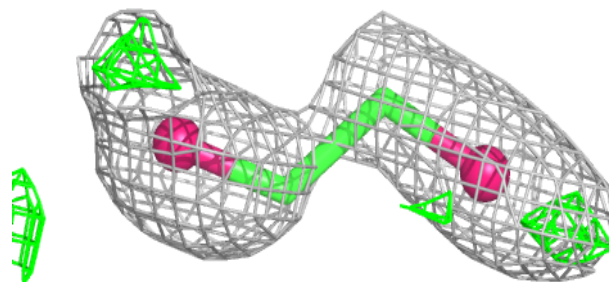


**Electron density around PEG F 312:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

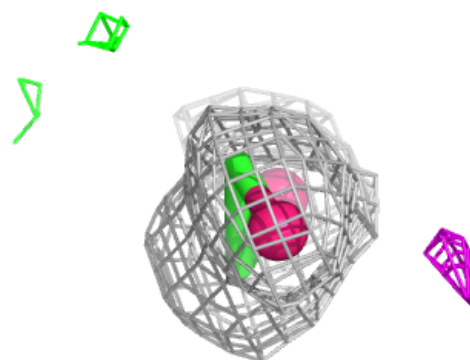
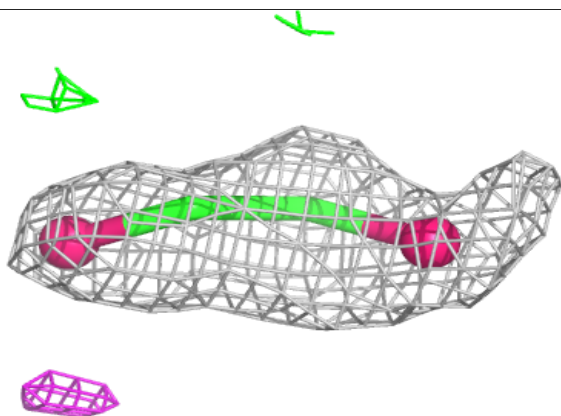
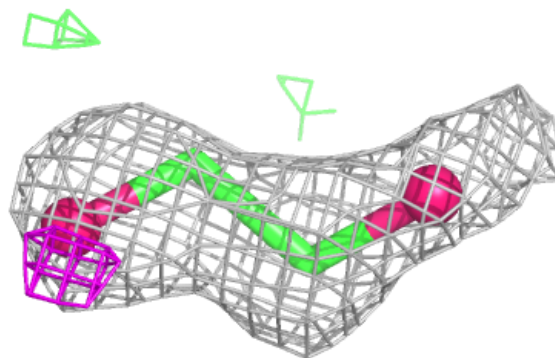
**Electron density around EDO C 308:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

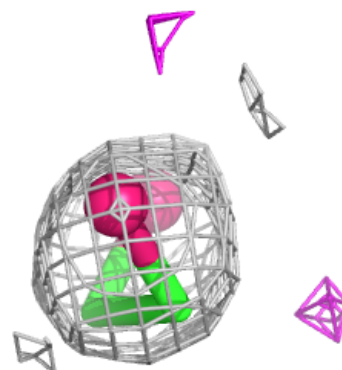
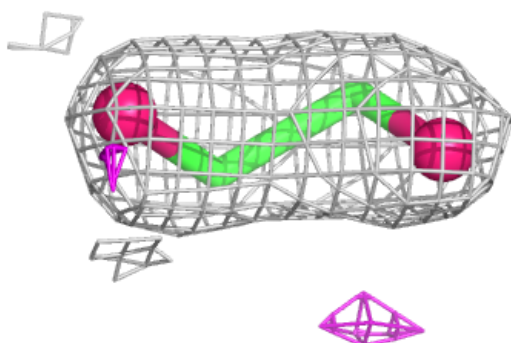
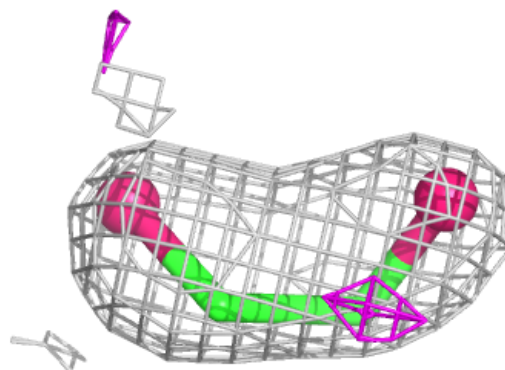


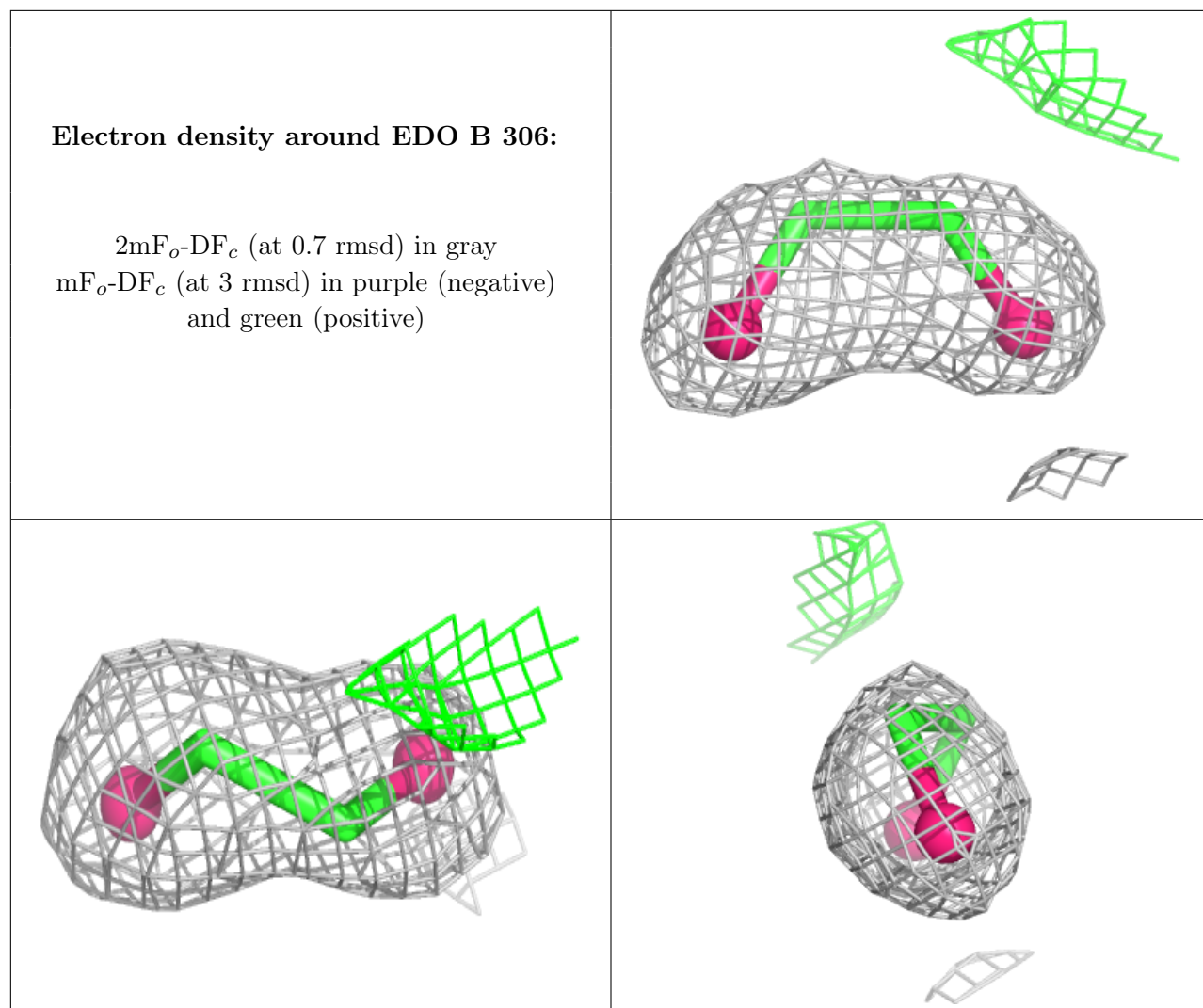
**Electron density around EDO F 306:**

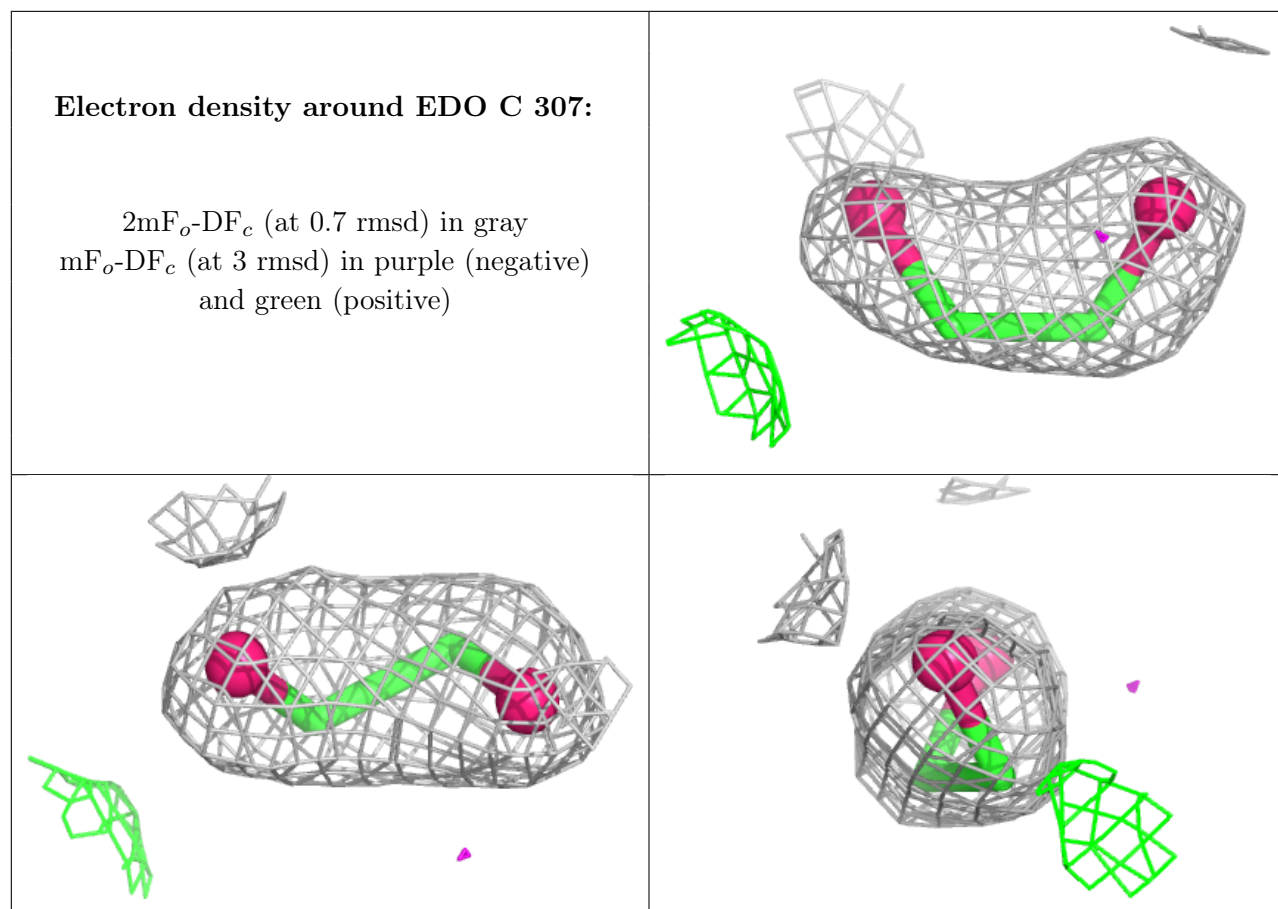
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**Electron density around EDO A 313:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

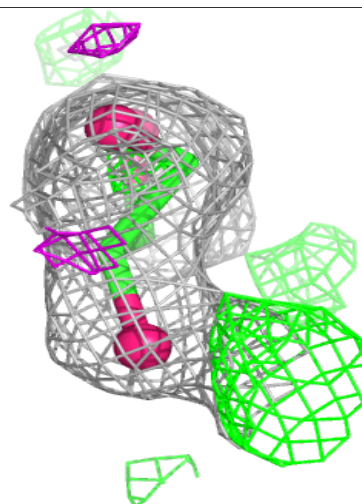
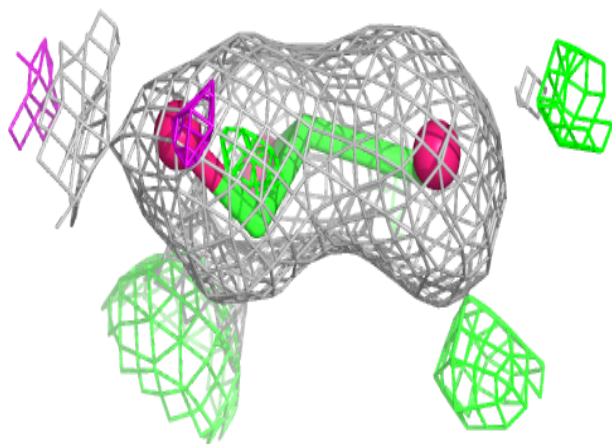
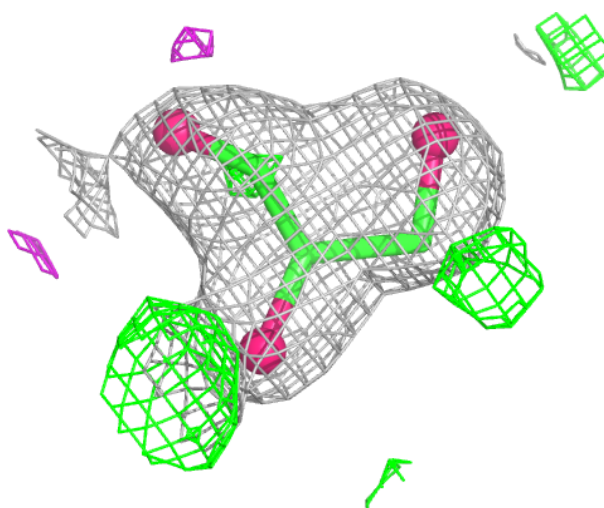






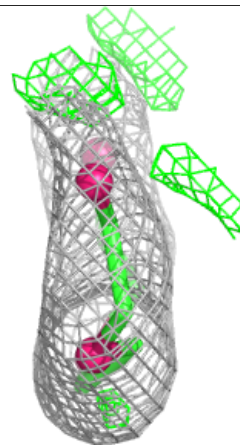
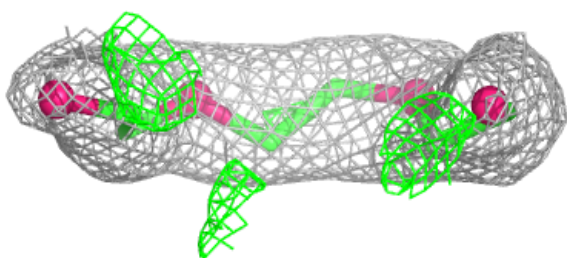
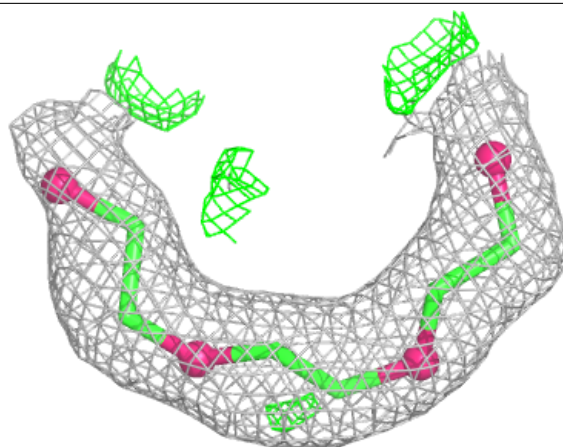
**Electron density around GOL F 314:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



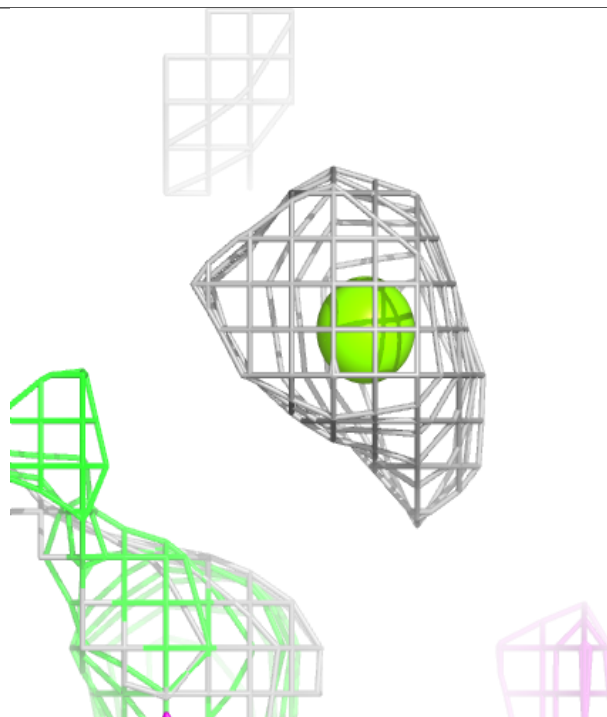
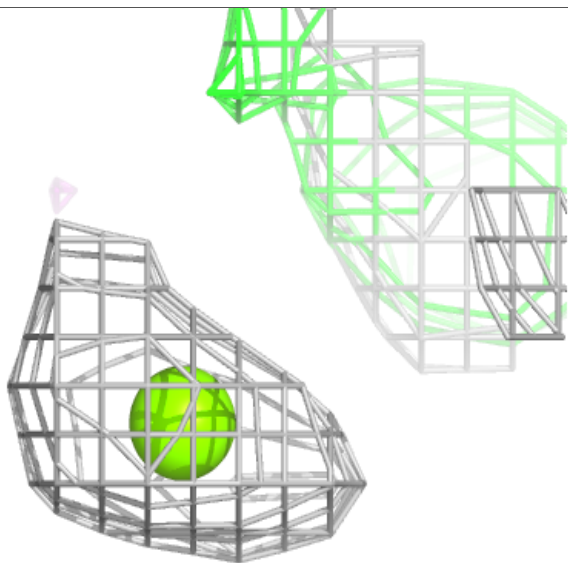
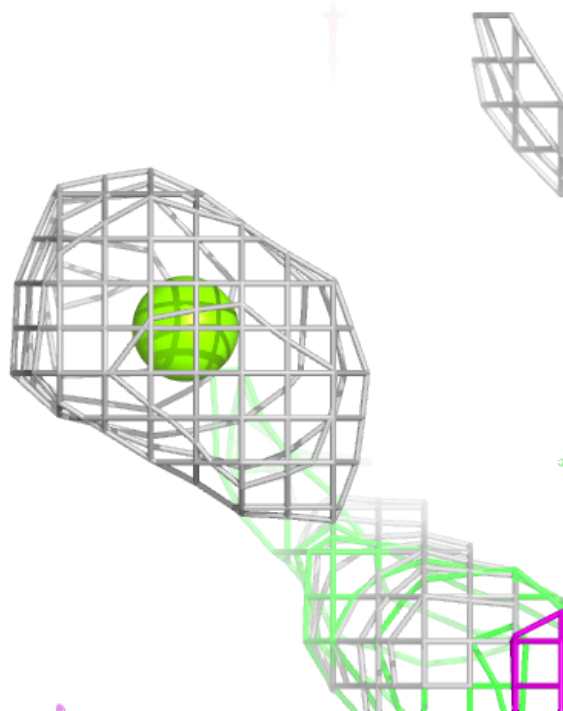
**Electron density around PGE E 311:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



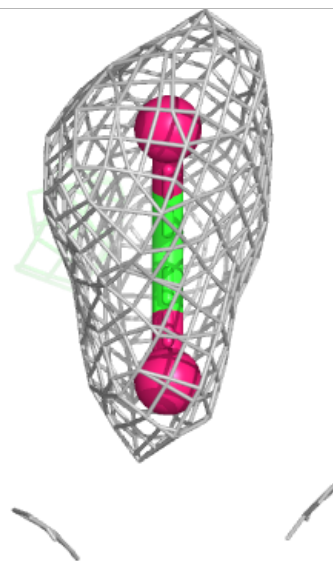
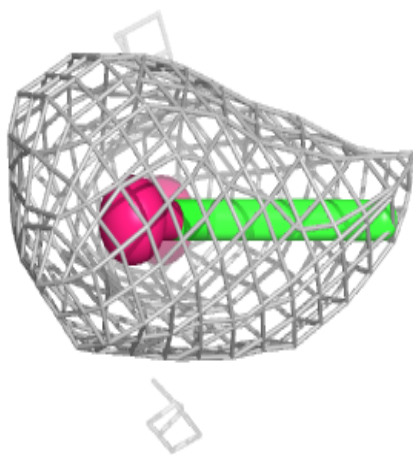
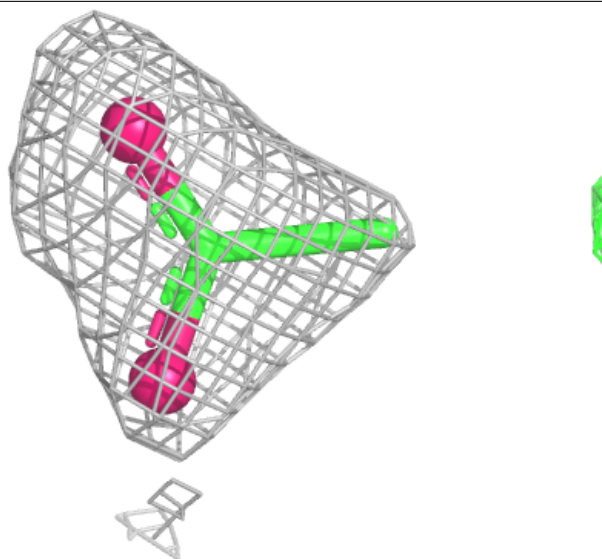
**Electron density around MG A 307:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



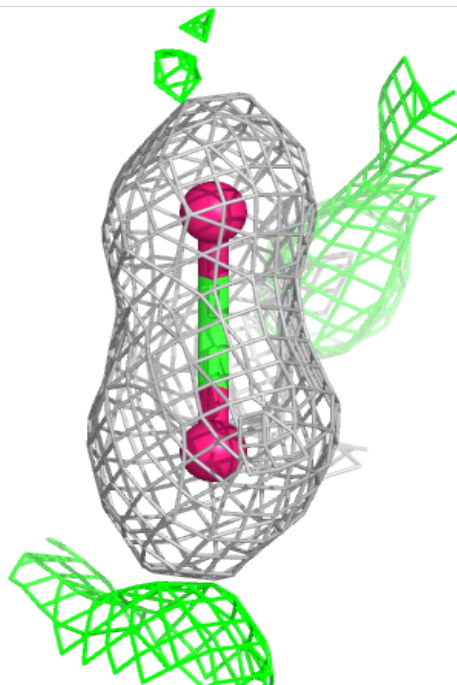
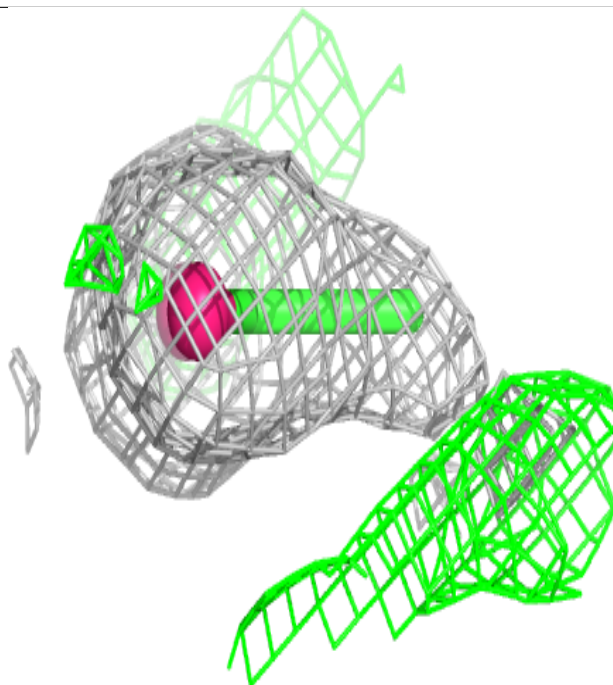
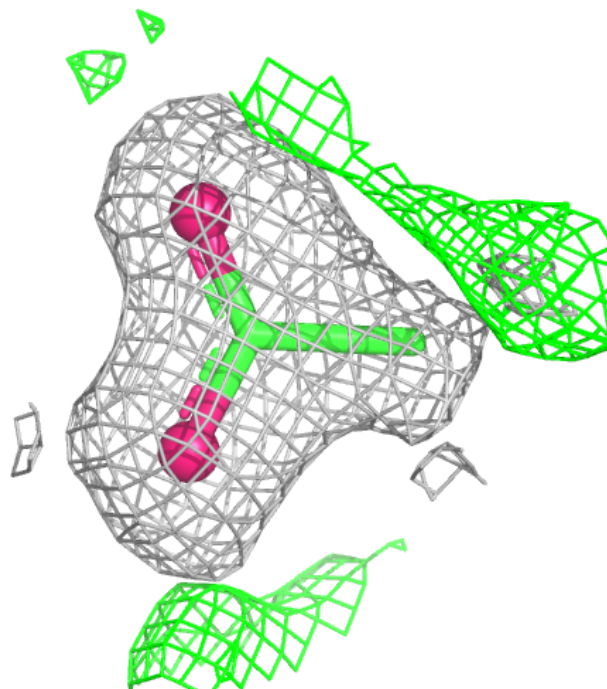
**Electron density around ACT F 303:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



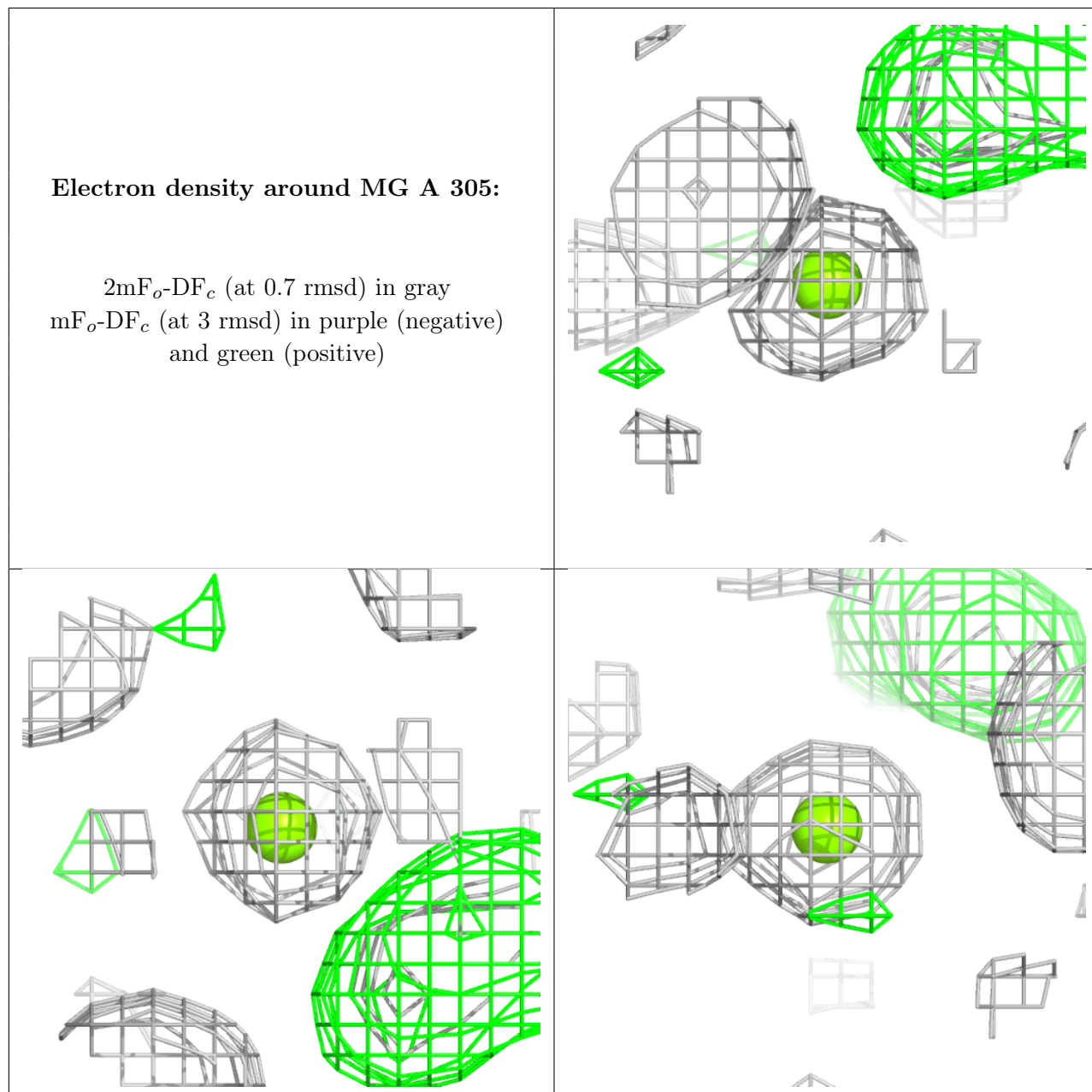
**Electron density around ACT A 309:**

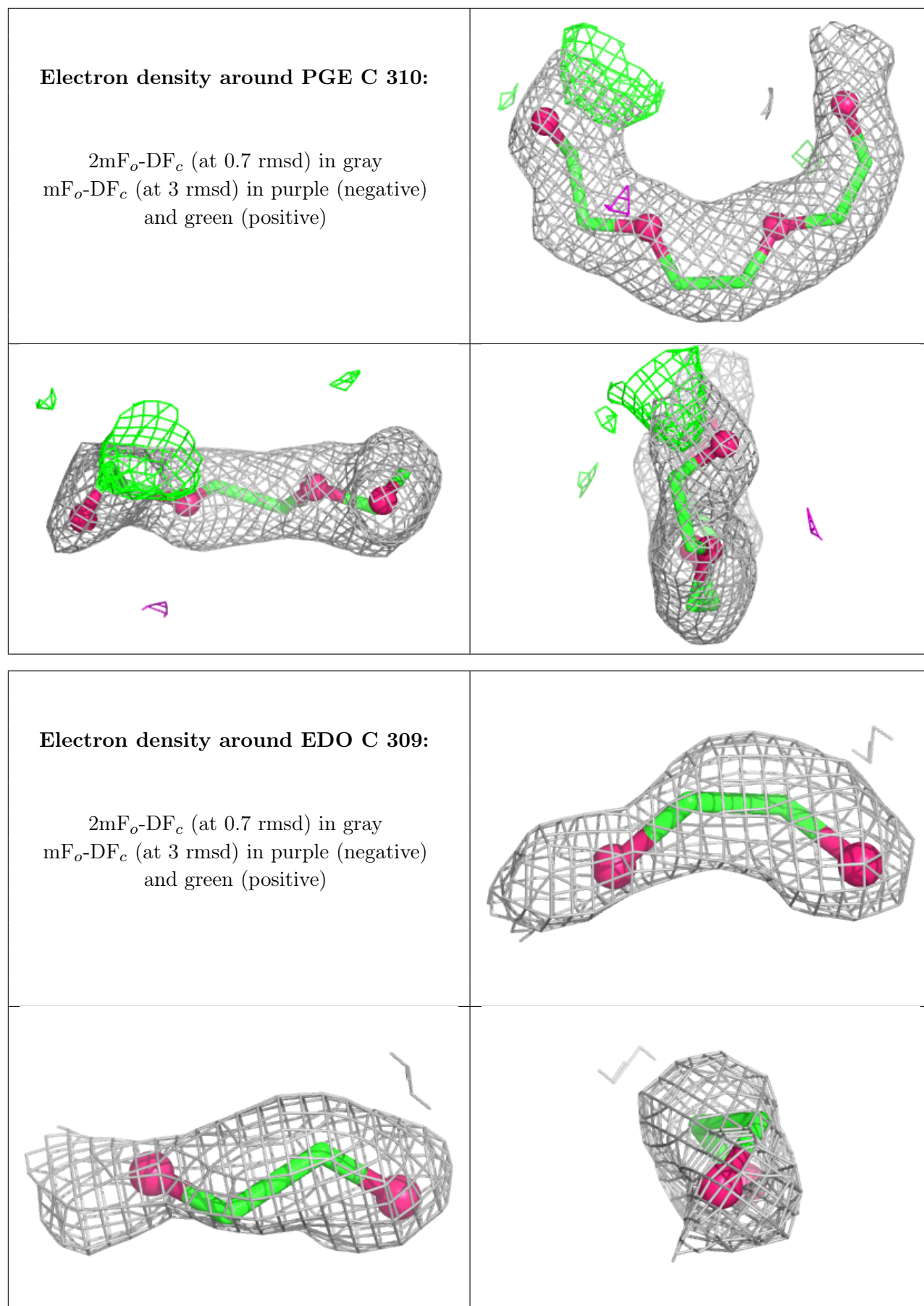
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around MG A 305:**

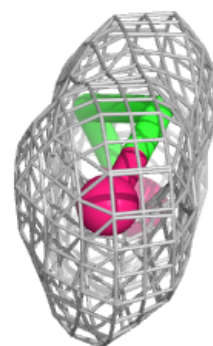
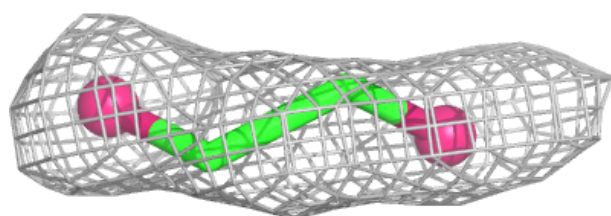
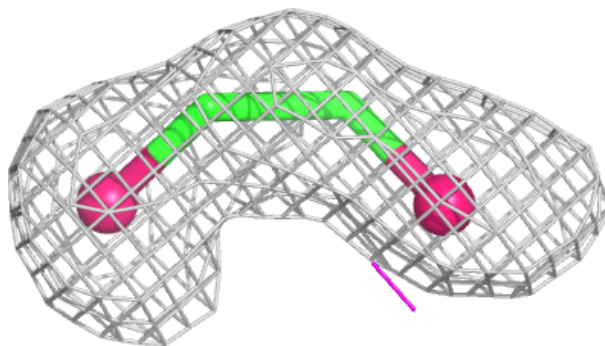
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



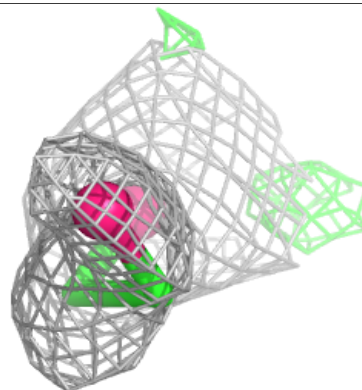
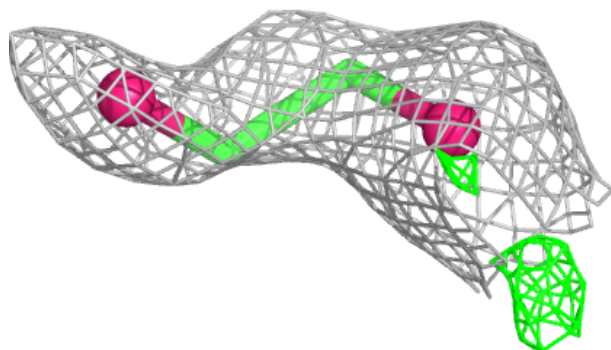
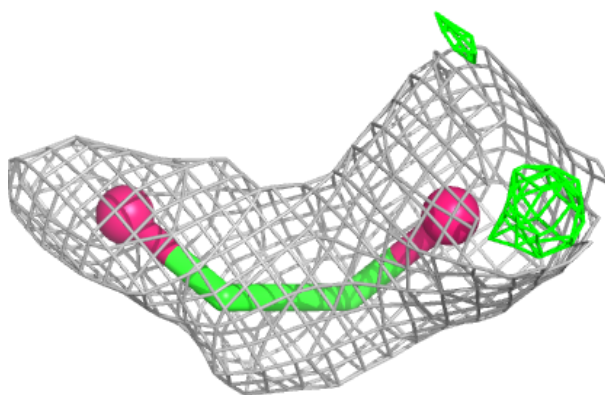


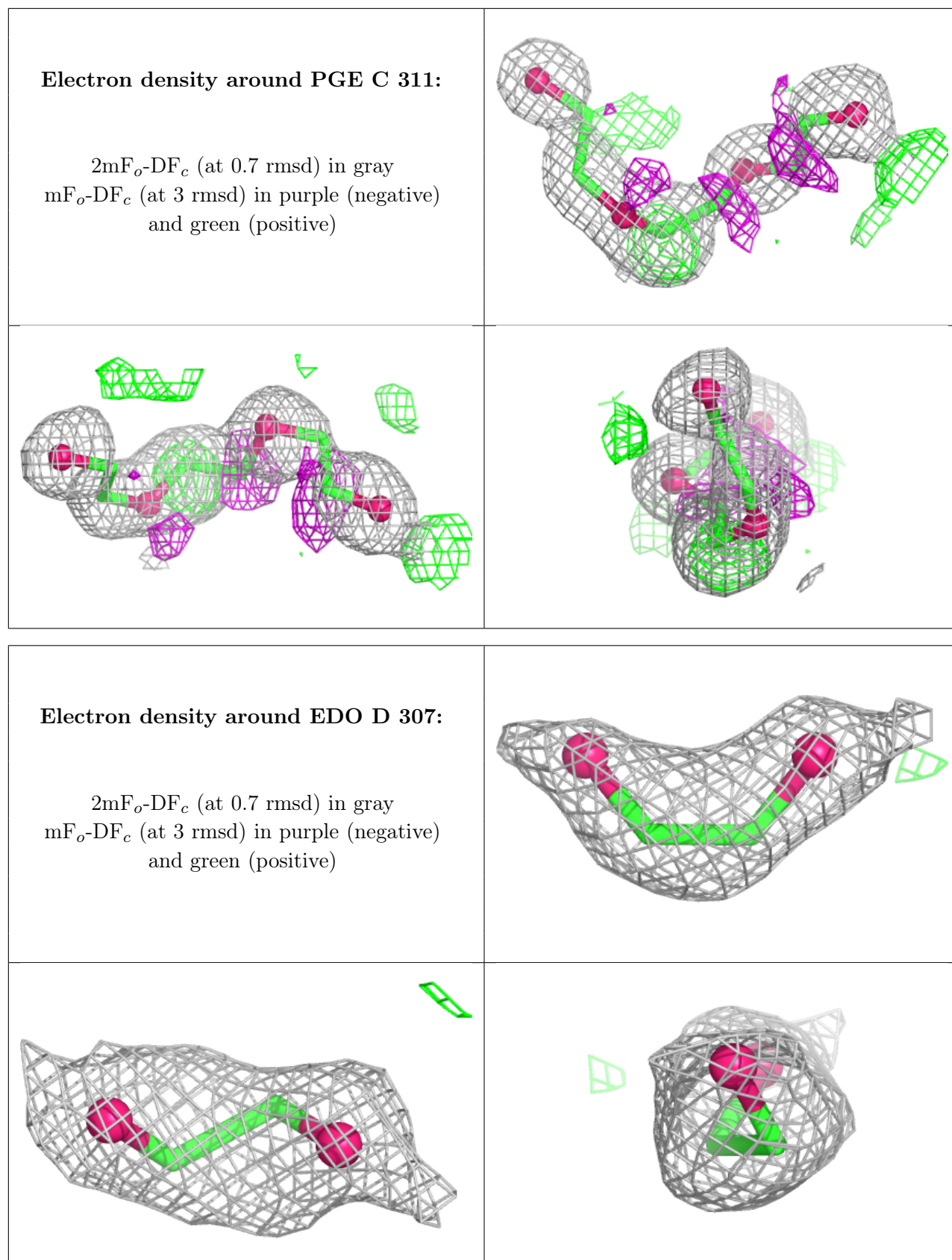
**Electron density around EDO F 305:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**Electron density around EDO D 310:**

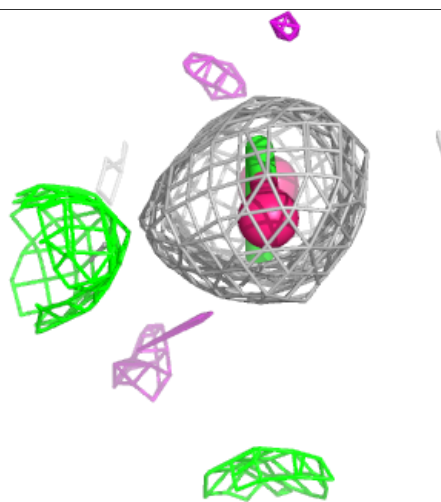
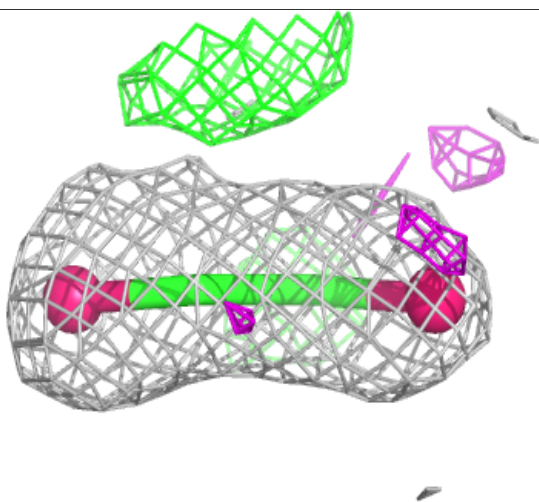
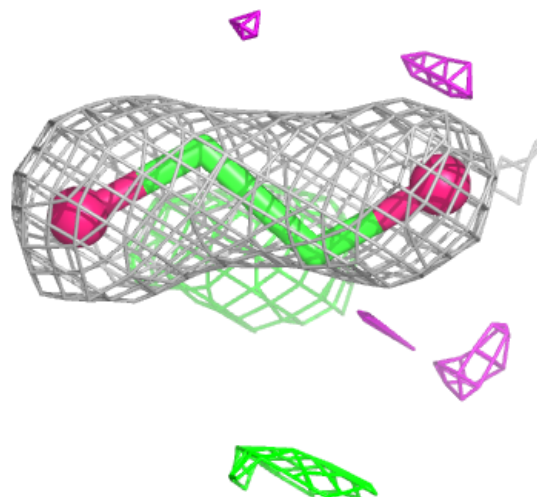
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

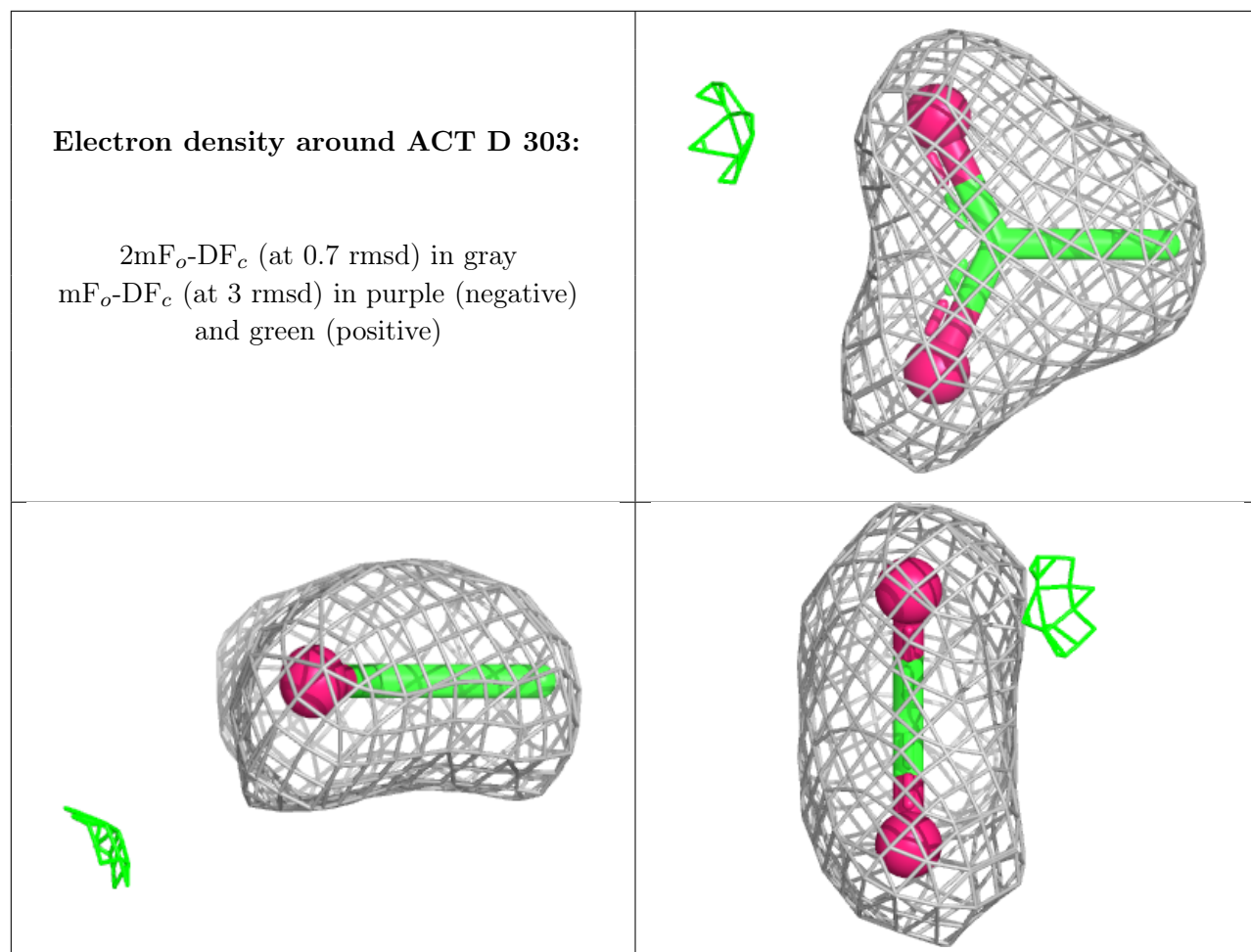


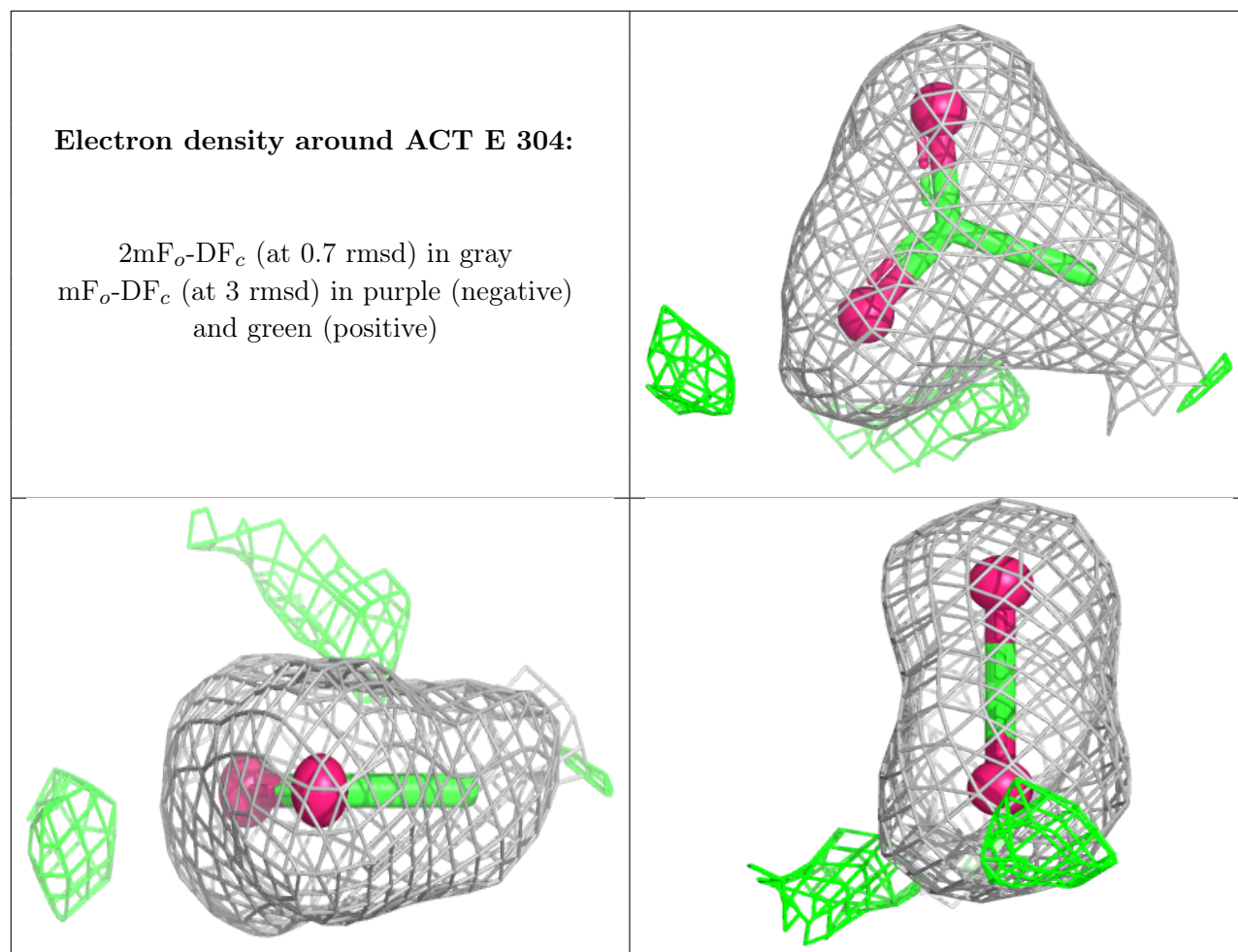


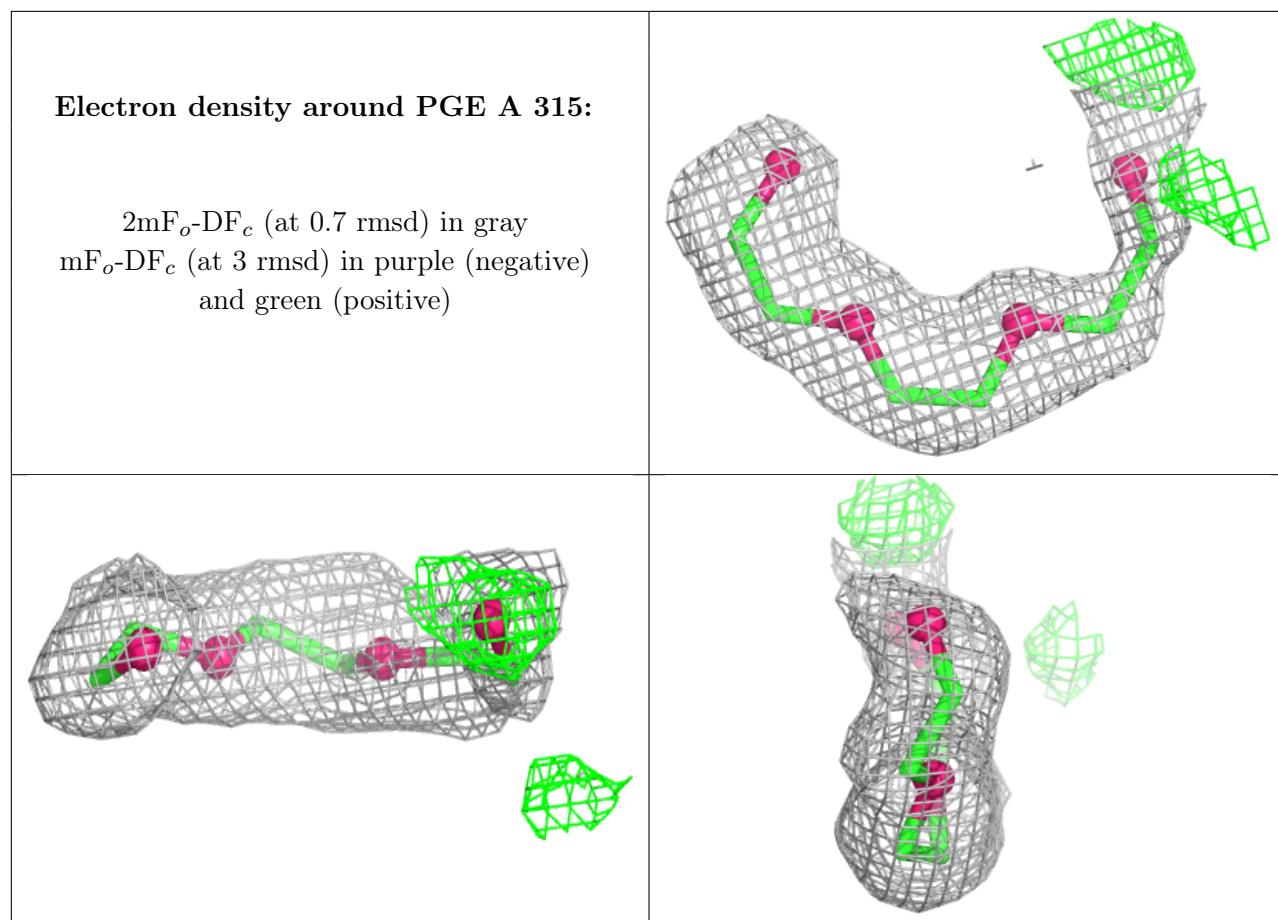
**Electron density around EDO D 312:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



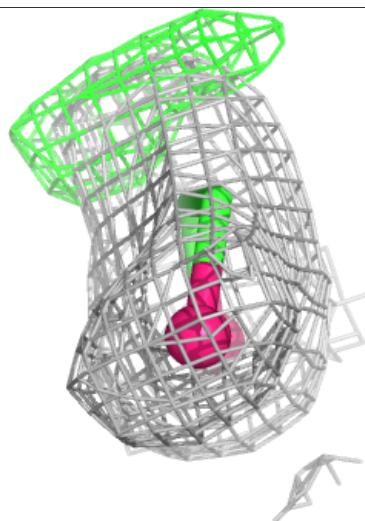
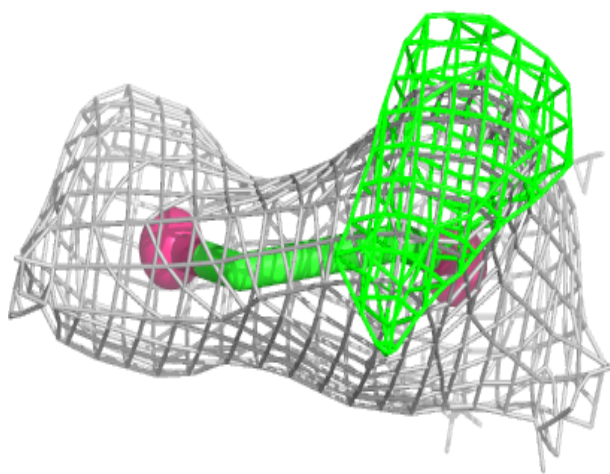
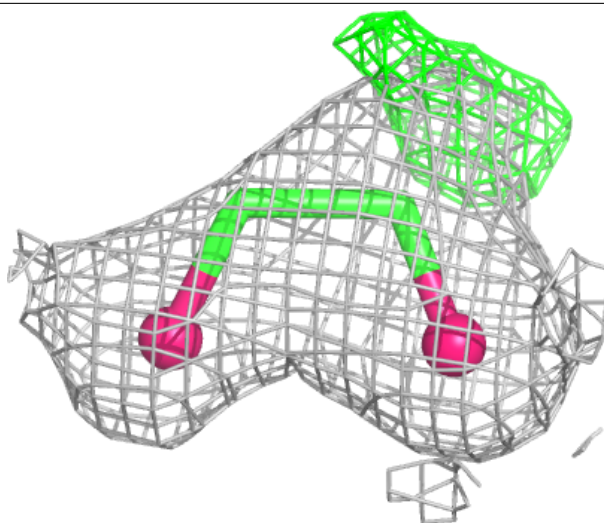






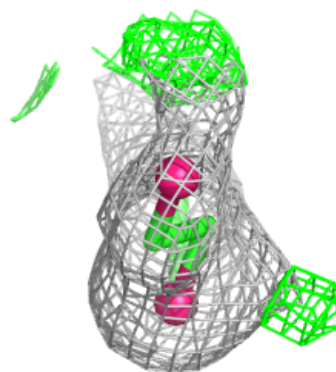
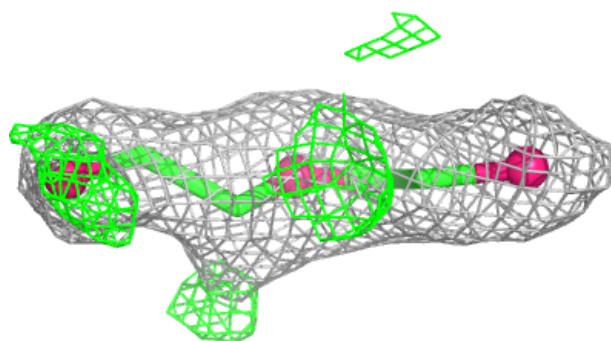
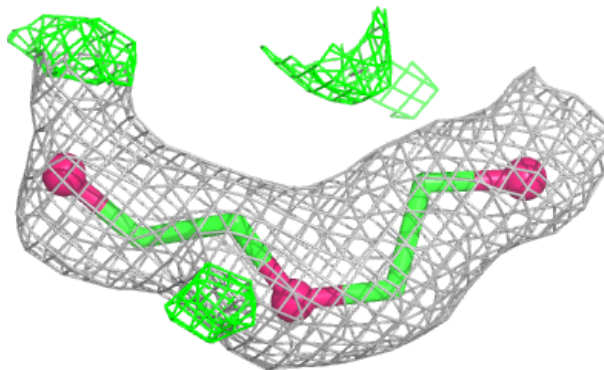
**Electron density around EDO A 314:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

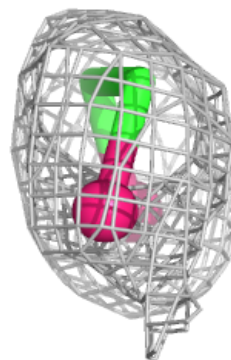
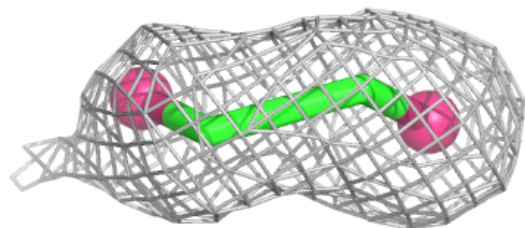
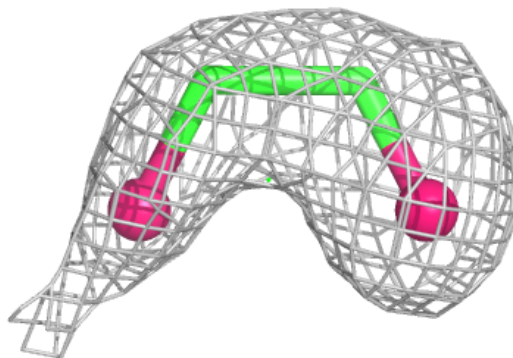


**Electron density around PEG F 311:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

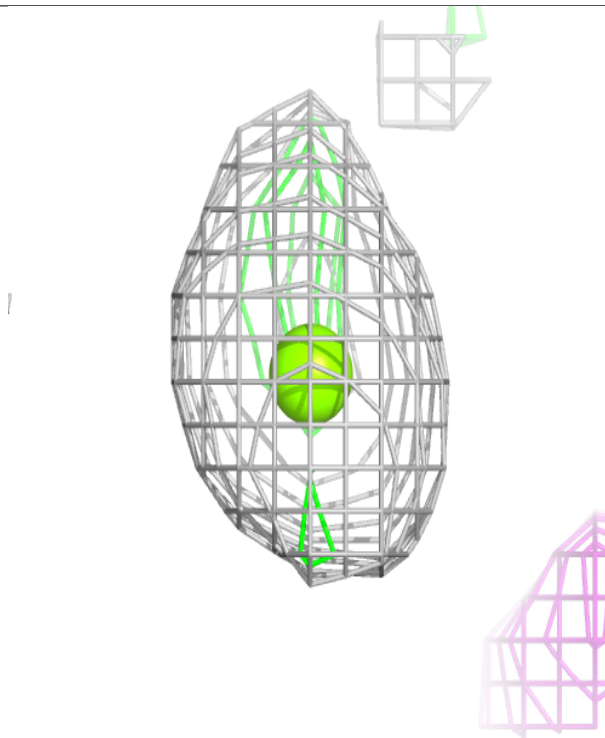
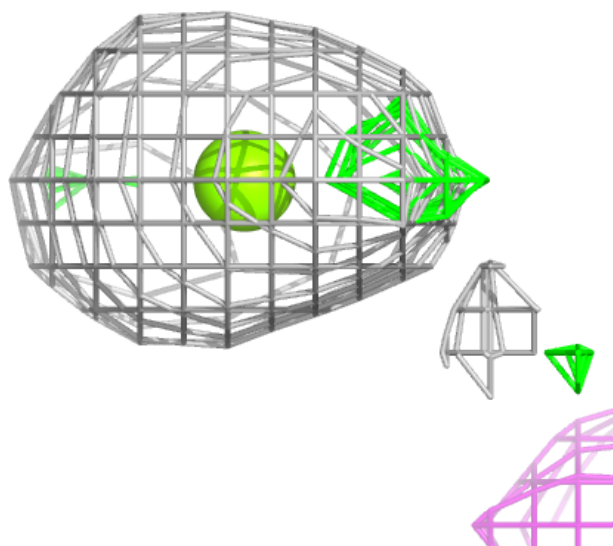
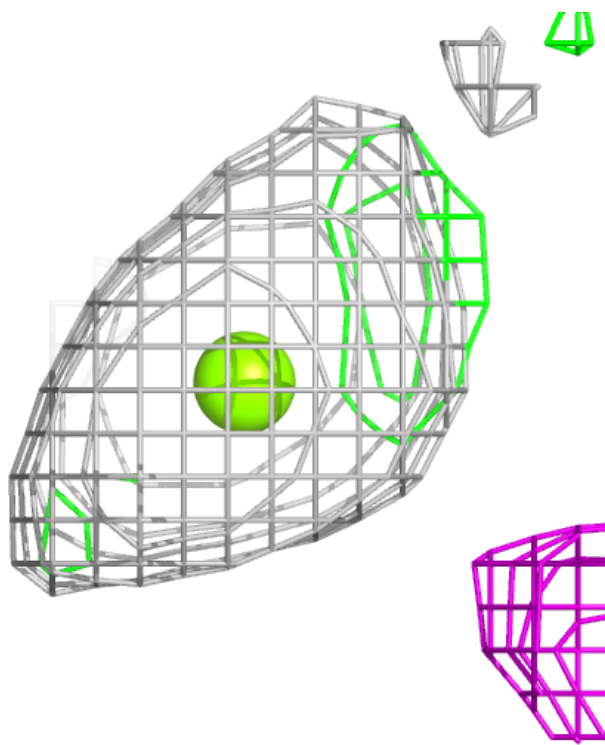
**Electron density around EDO F 309:**

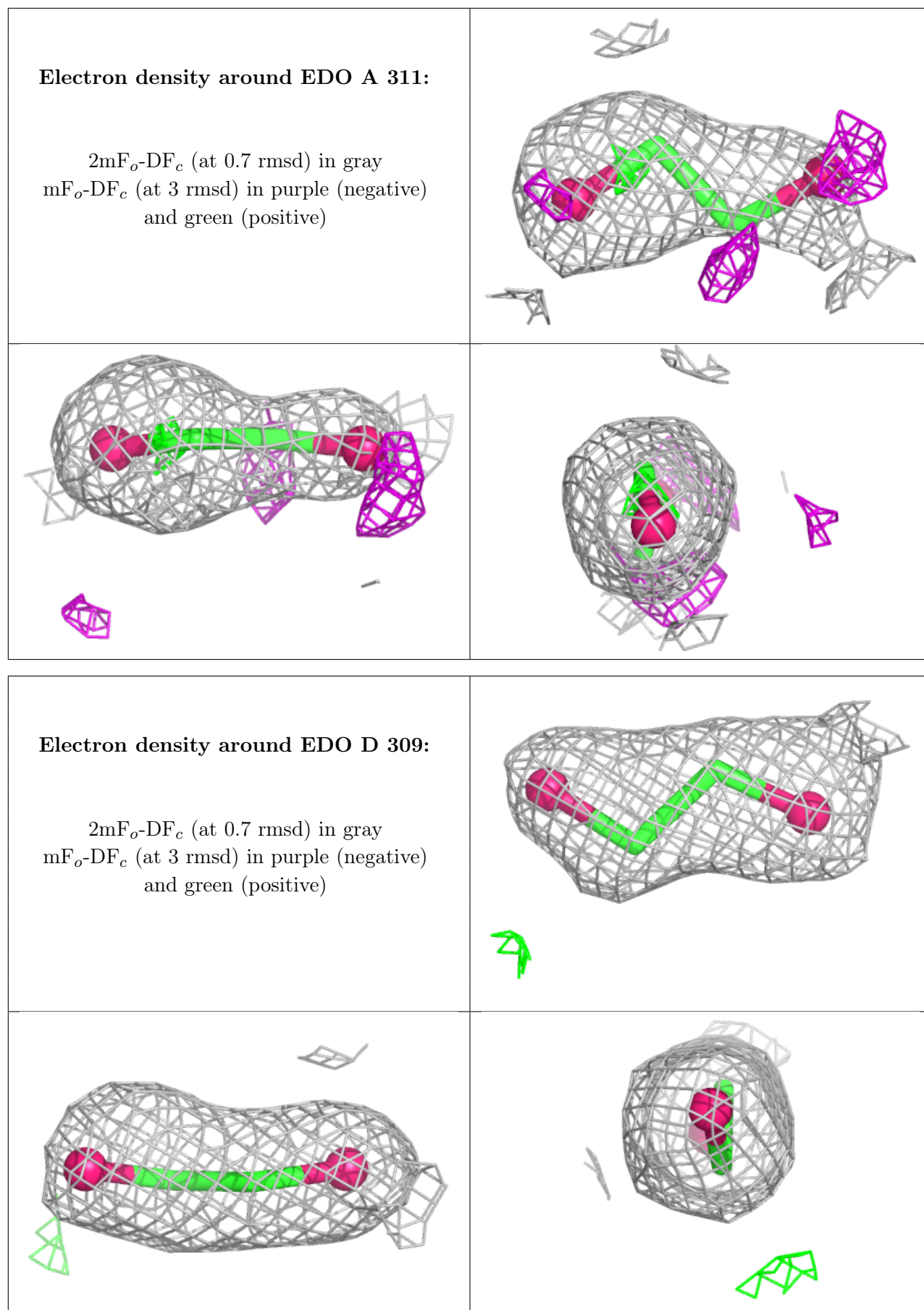
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

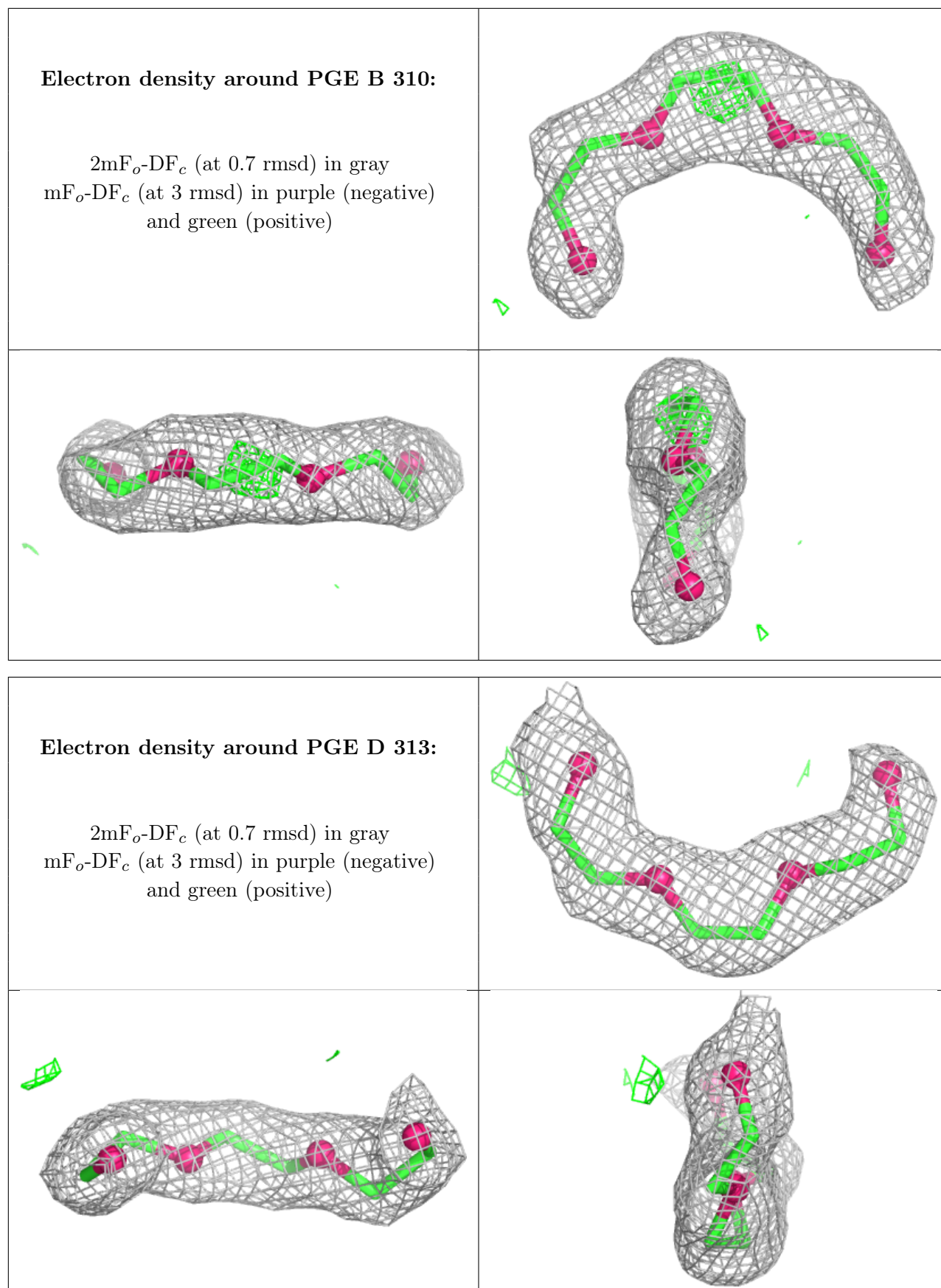


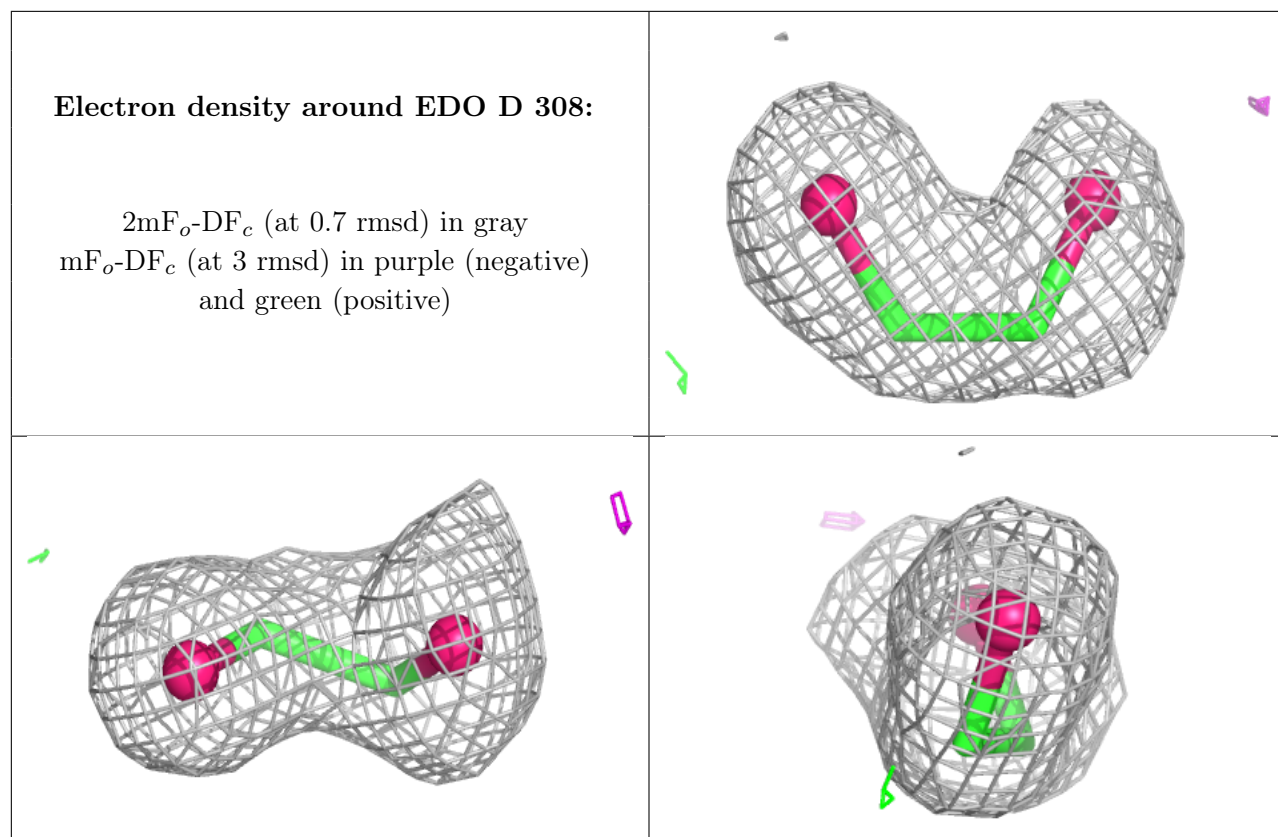
**Electron density around MG E 302:**

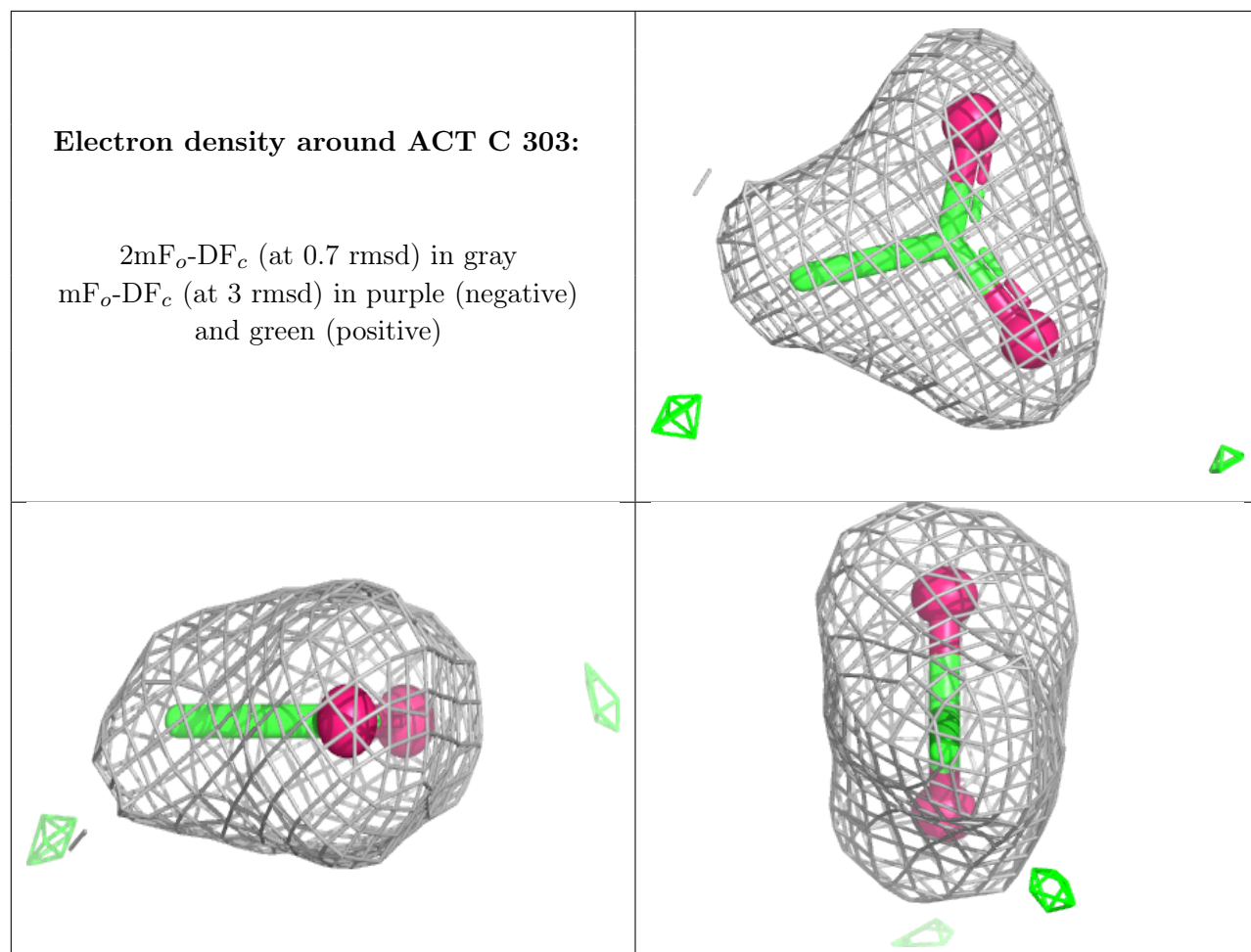
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





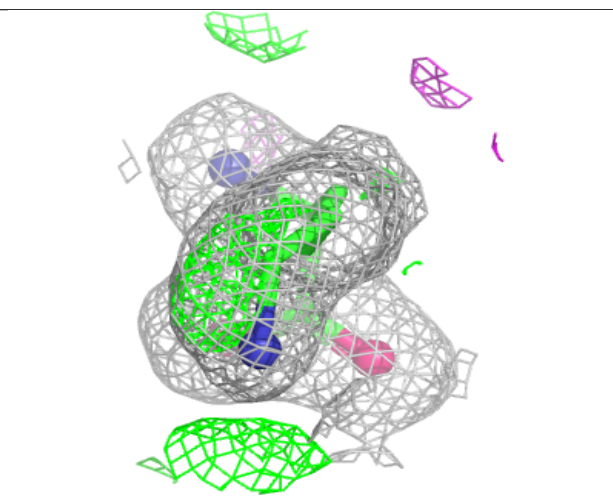
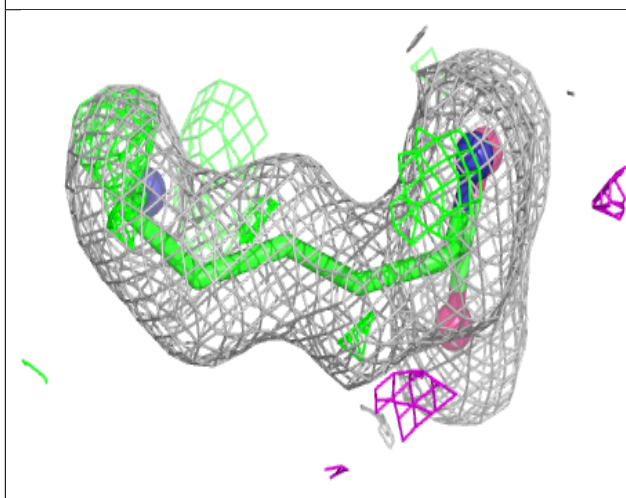
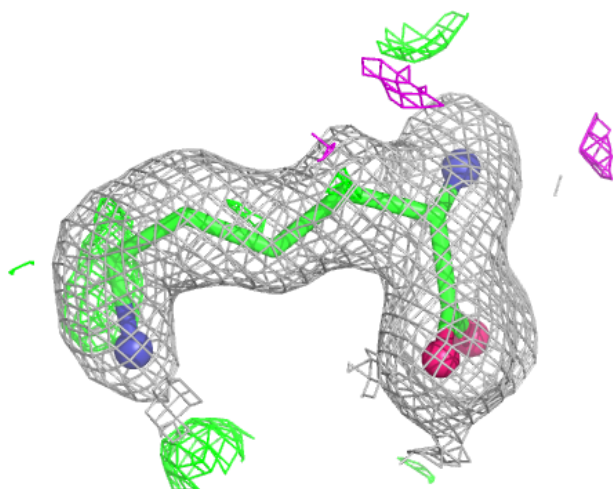






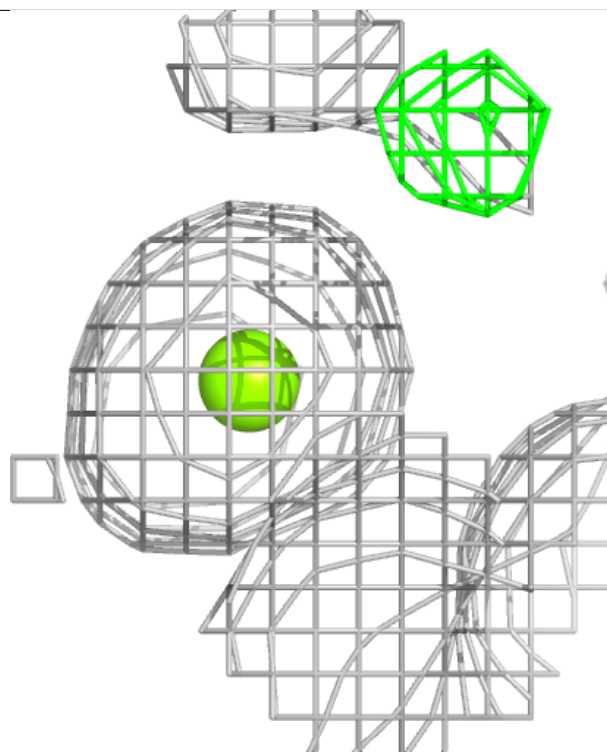
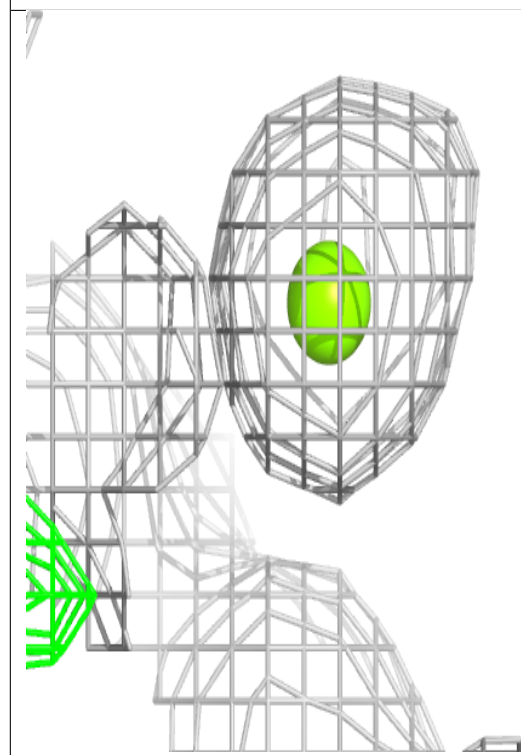
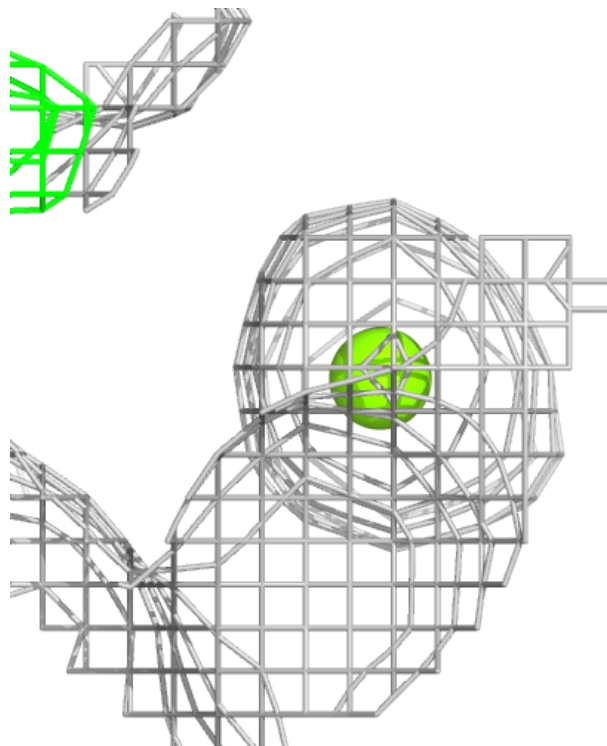
**Electron density around LYS B 301:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



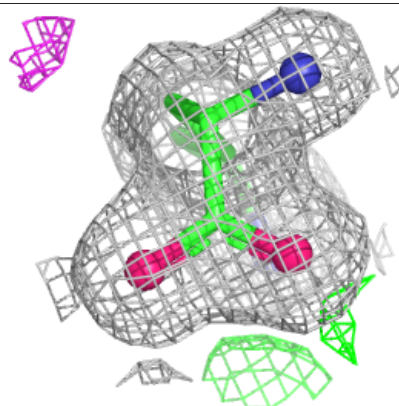
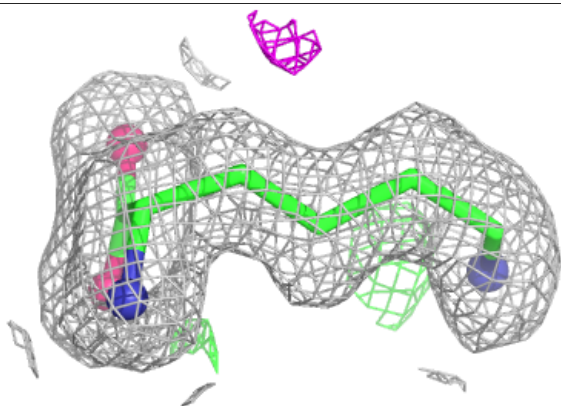
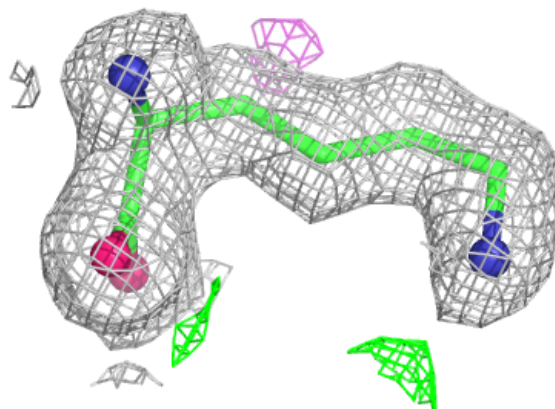
**Electron density around MG A 306:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



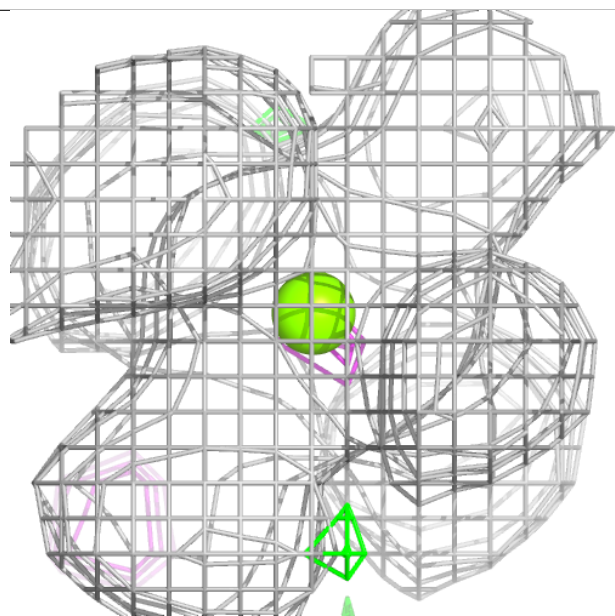
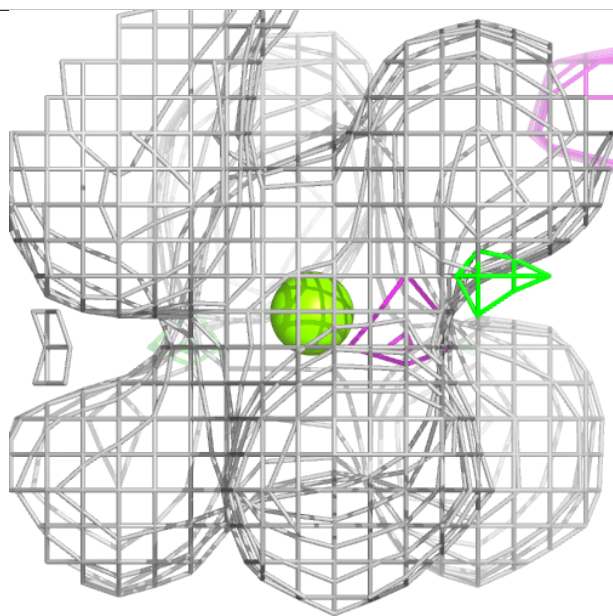
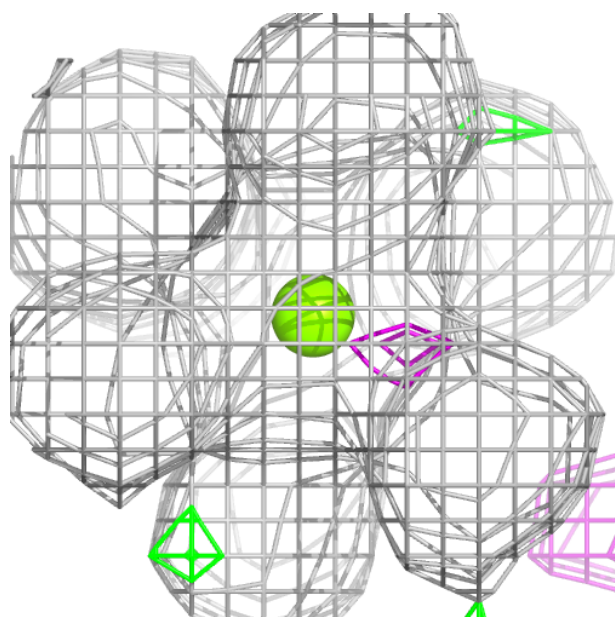
**Electron density around LYS F 301:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



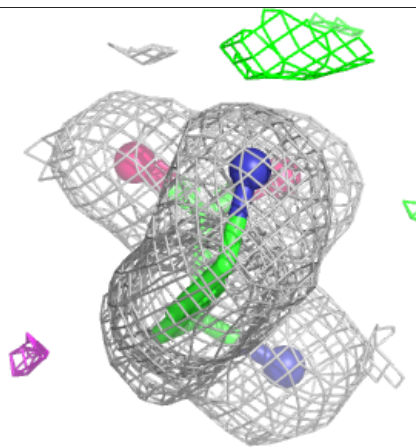
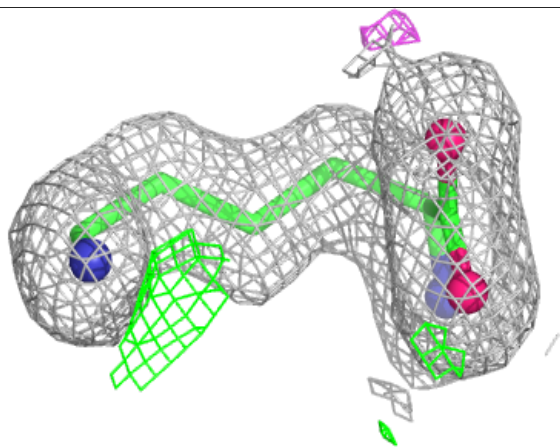
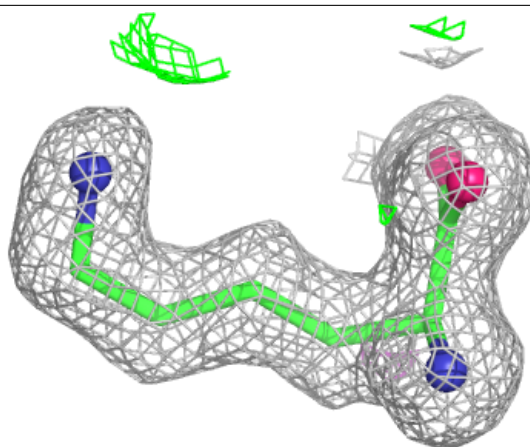
**Electron density around MG B 302:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



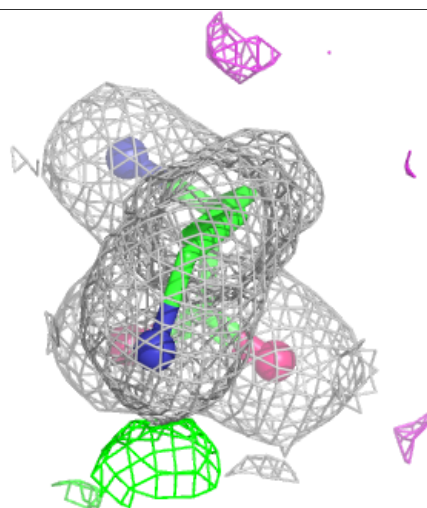
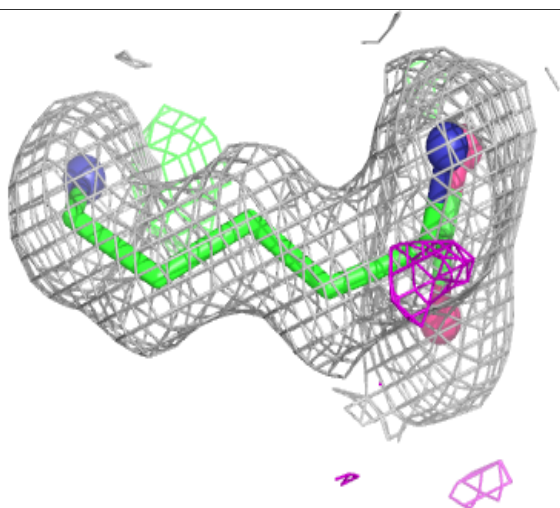
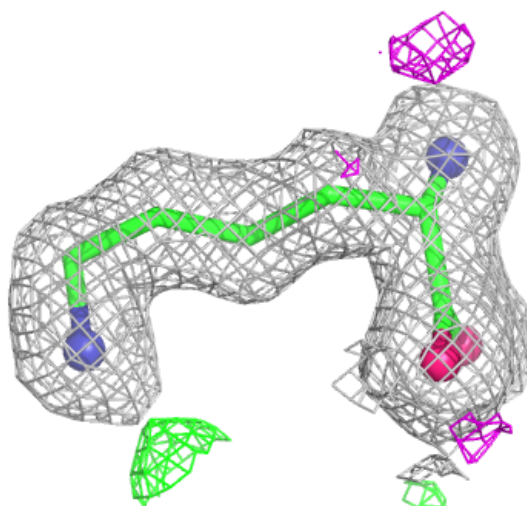
**Electron density around LYS A 301:**

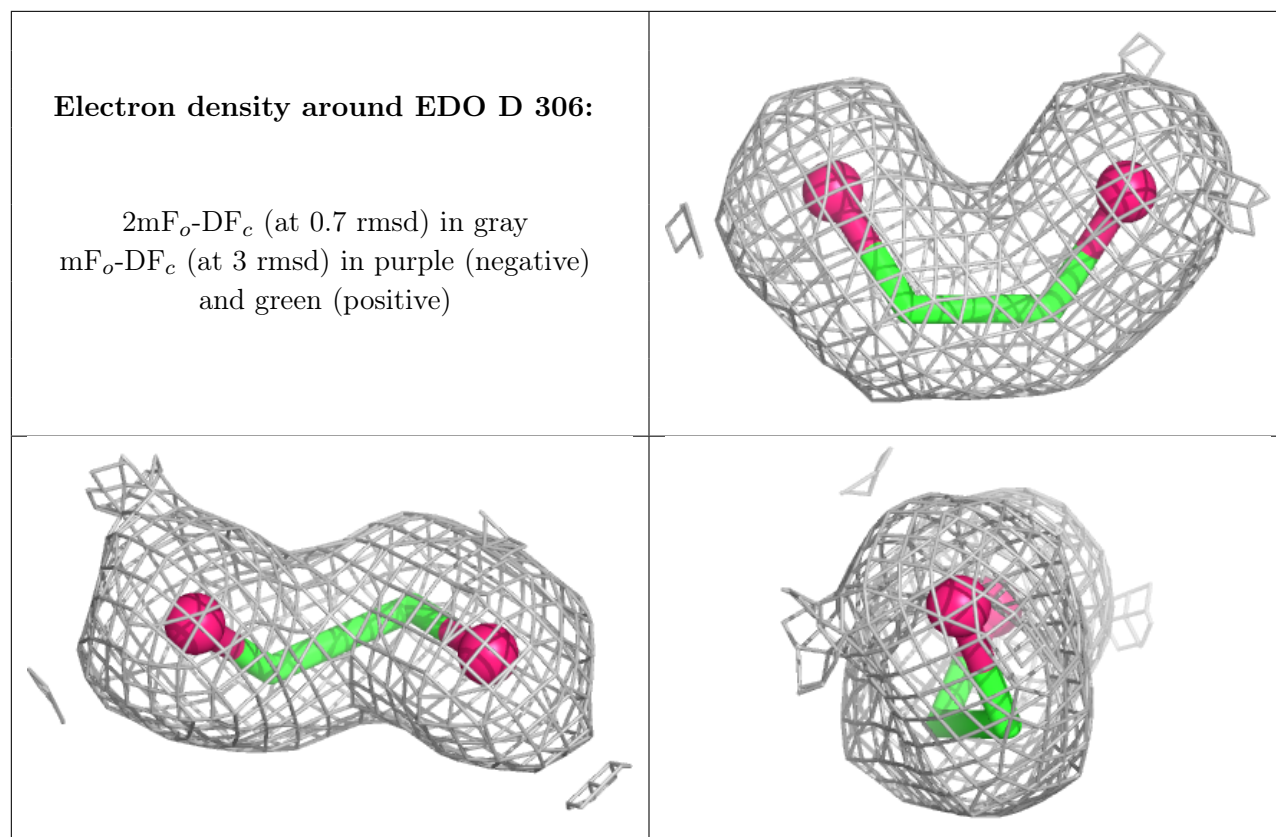
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around LYS C 301:**

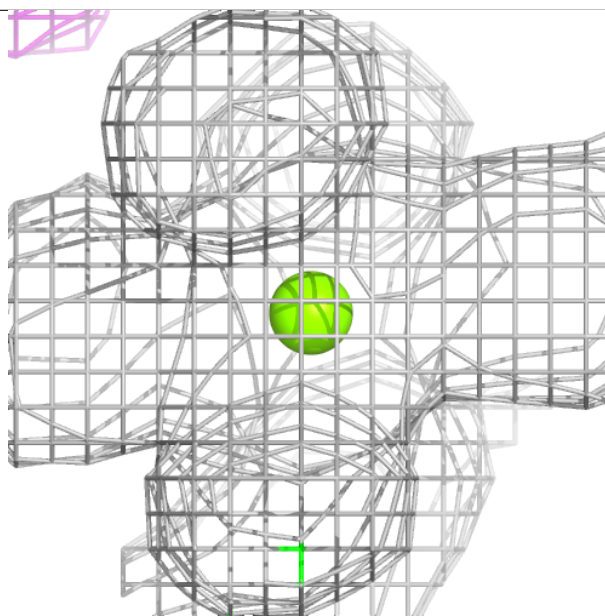
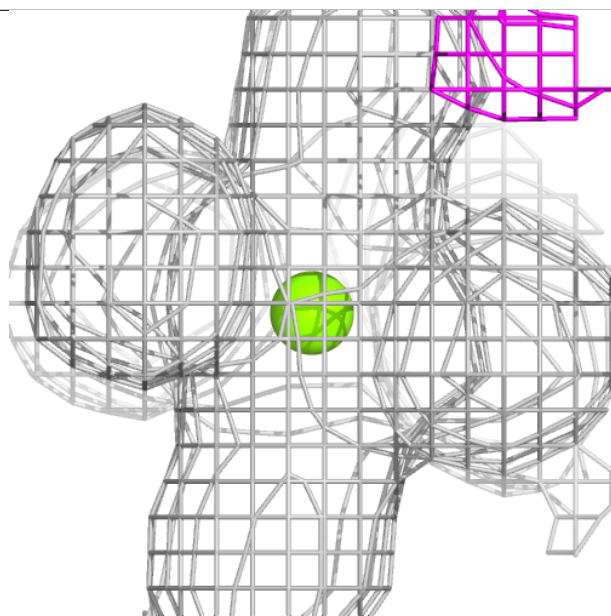
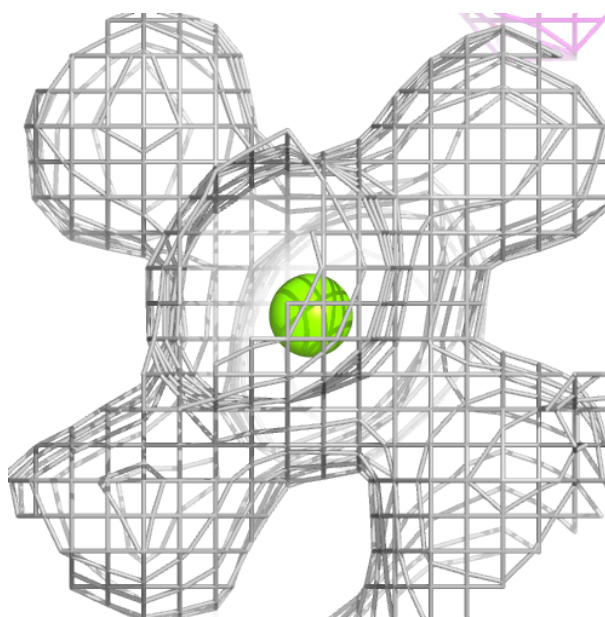
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





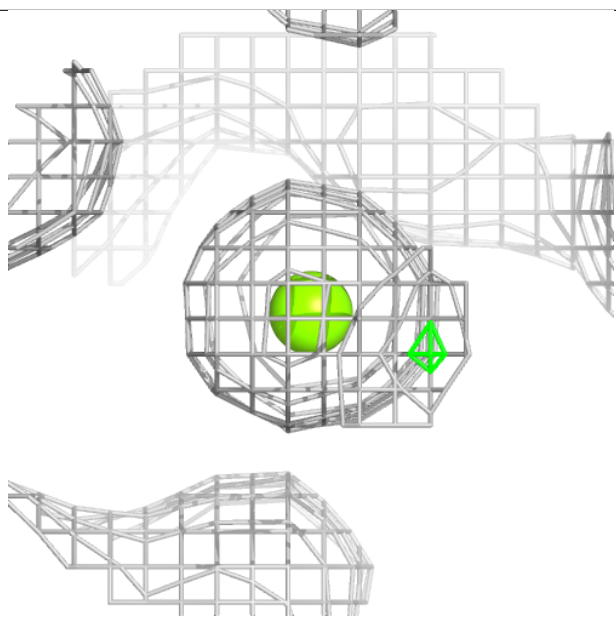
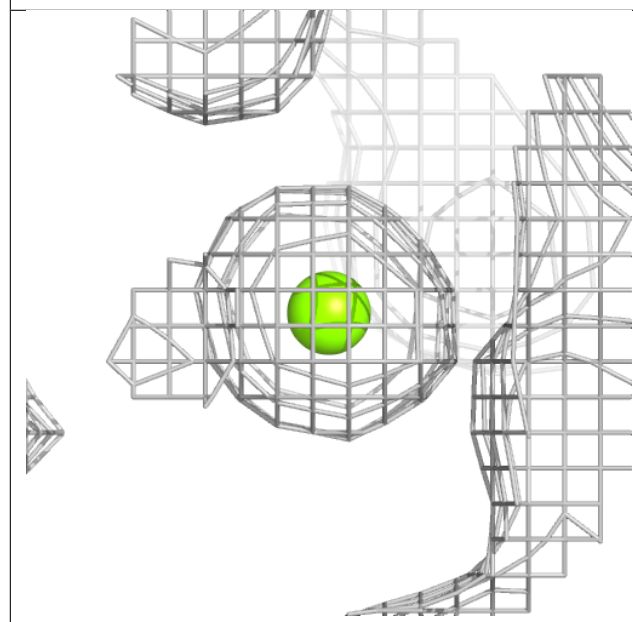
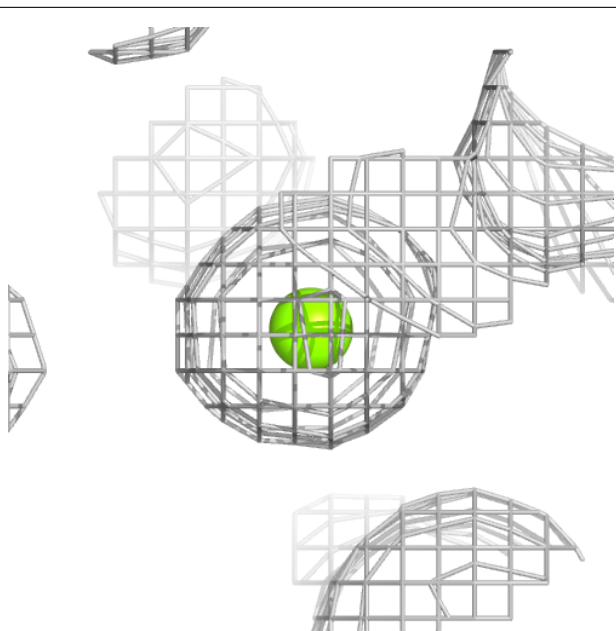
**Electron density around MG A 302:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



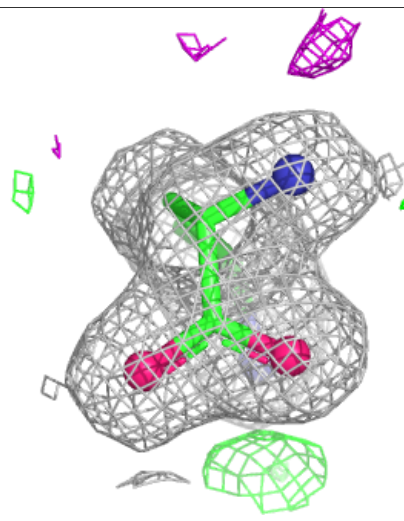
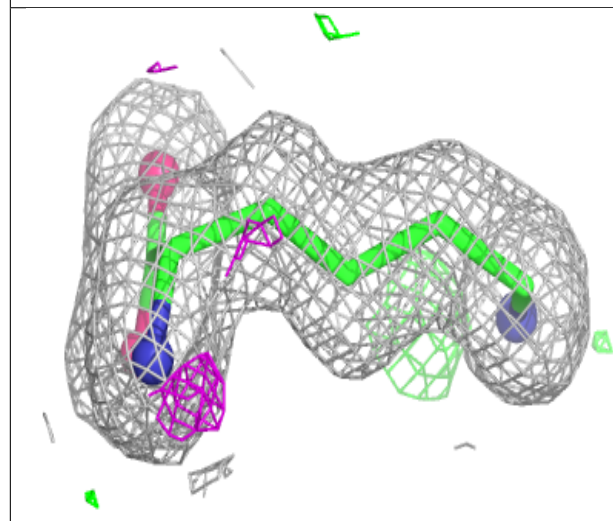
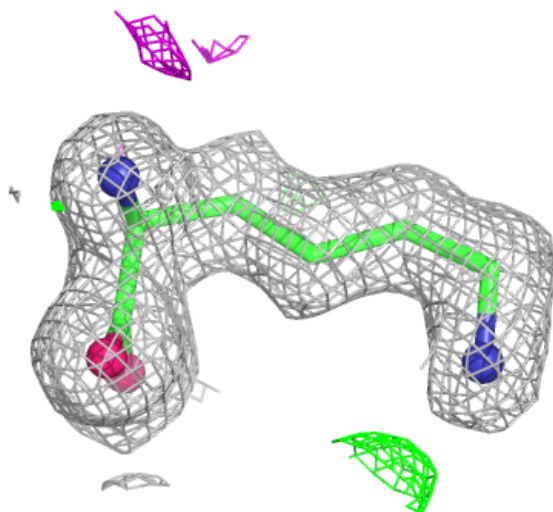
**Electron density around MG A 304:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



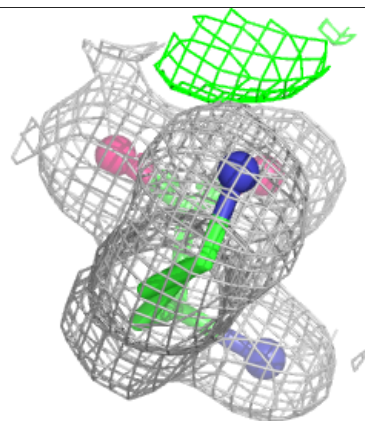
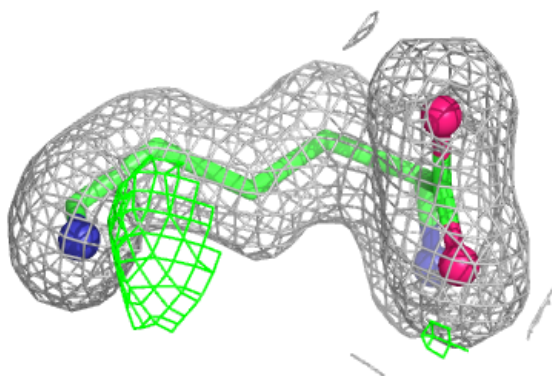
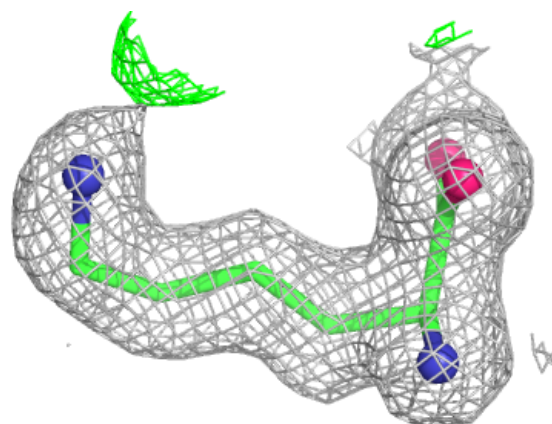
**Electron density around LYS D 301:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



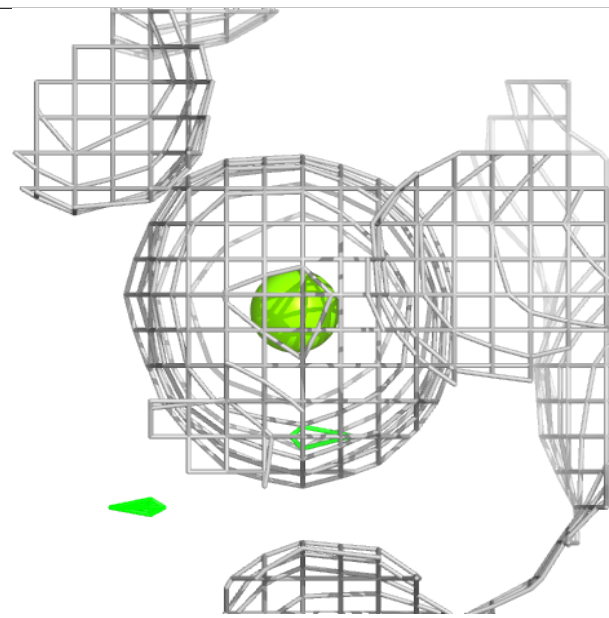
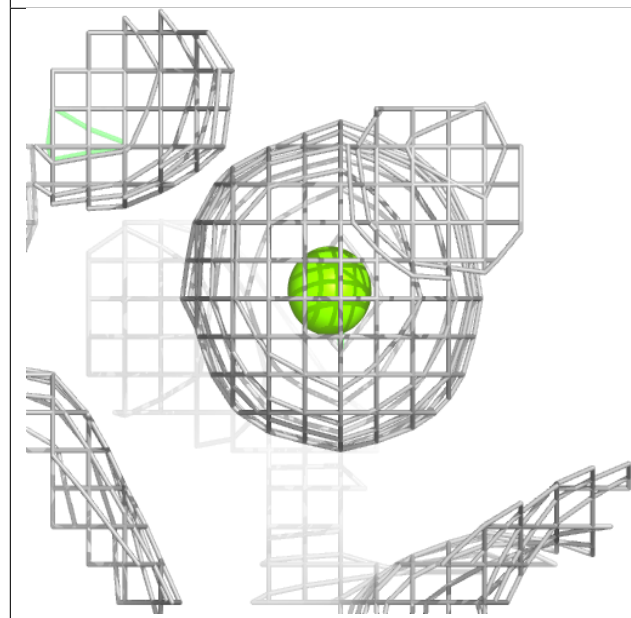
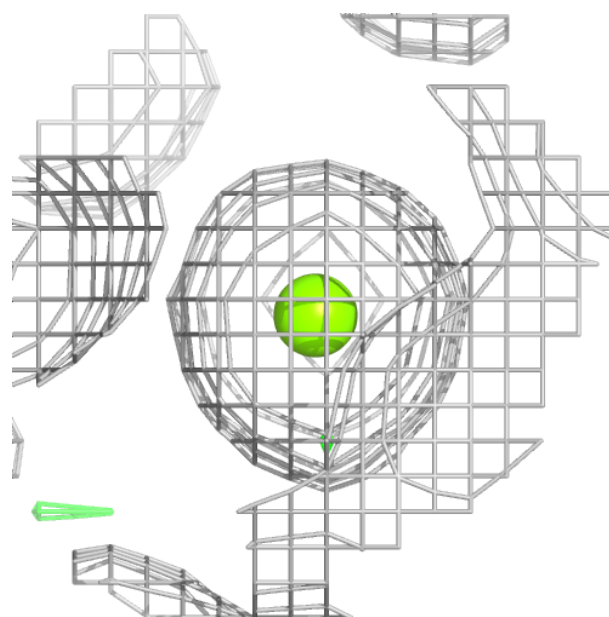
**Electron density around LYS E 301:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



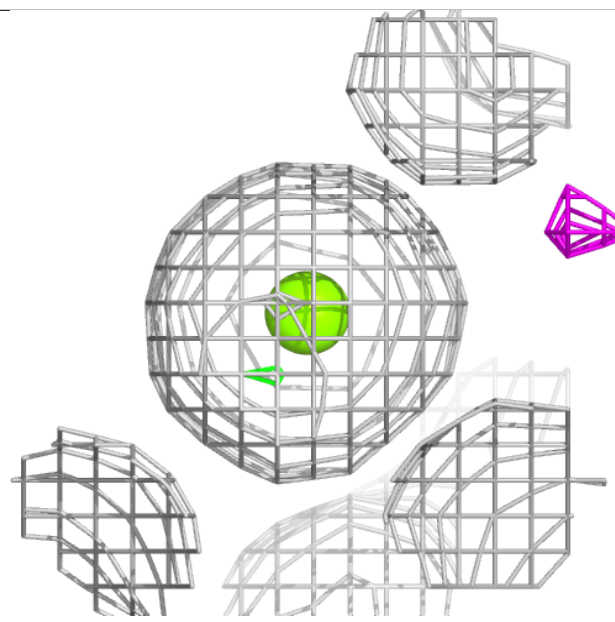
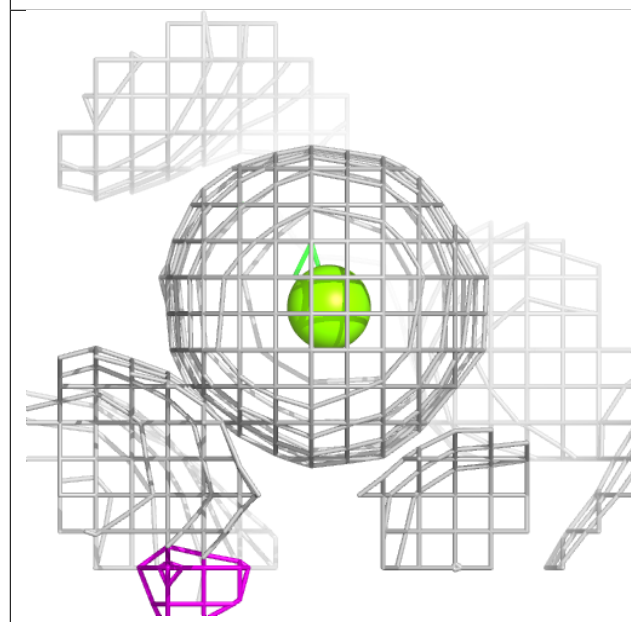
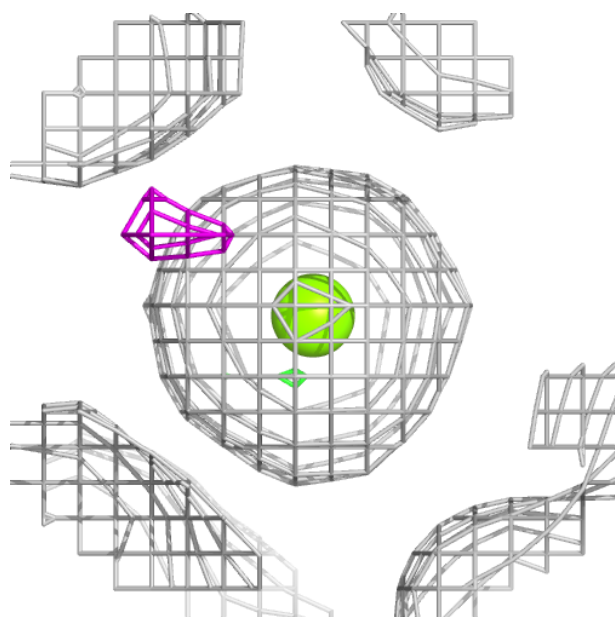
**Electron density around MG B 303:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



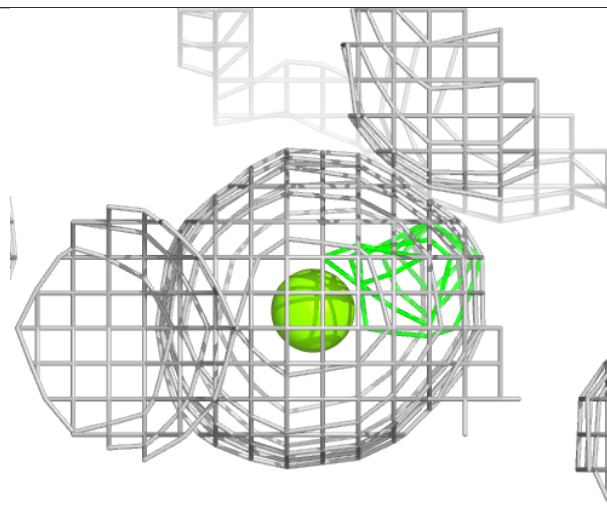
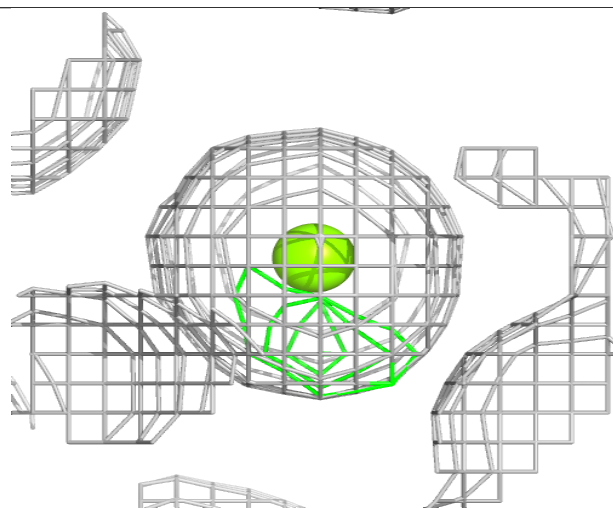
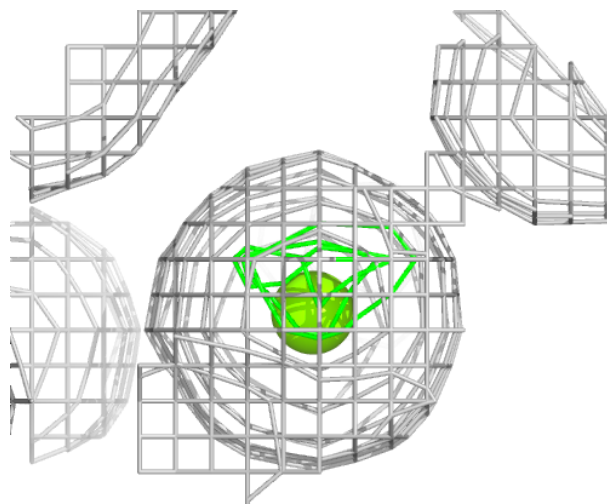
**Electron density around MG E 303:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



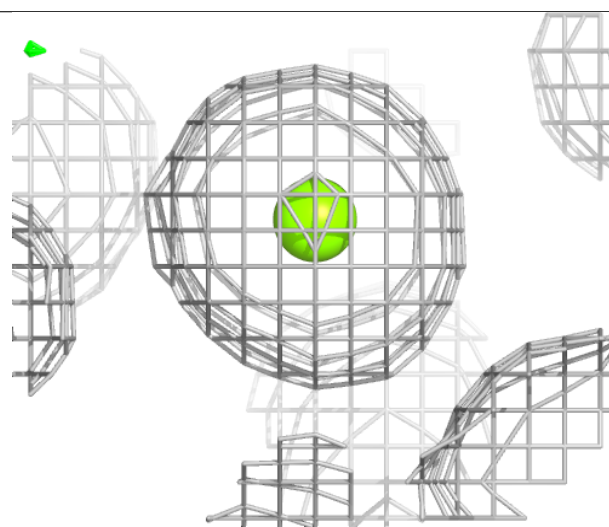
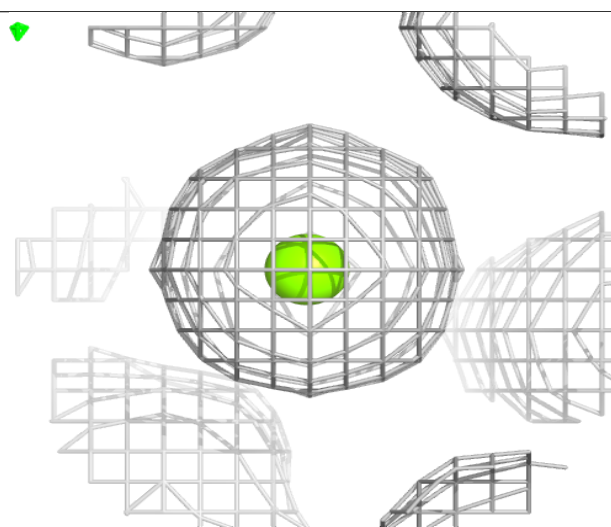
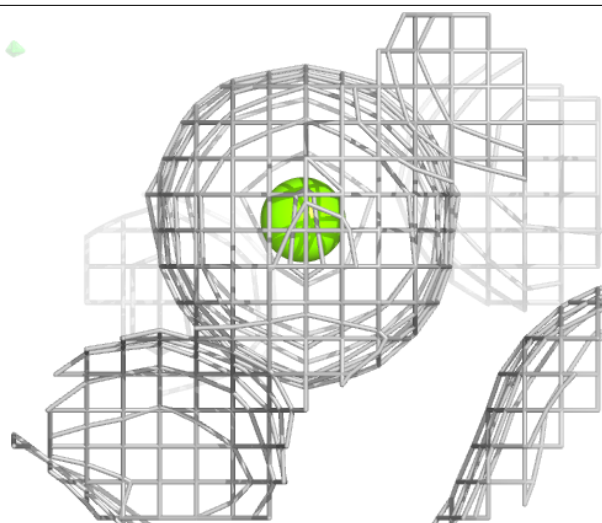
**Electron density around MG D 302:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



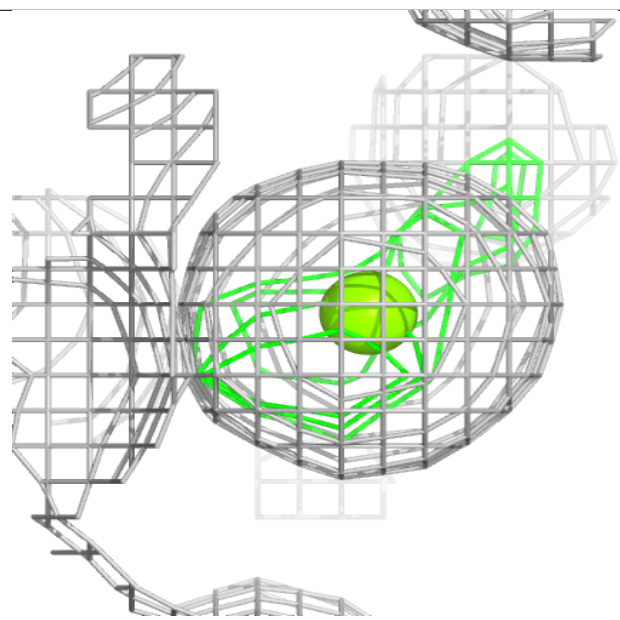
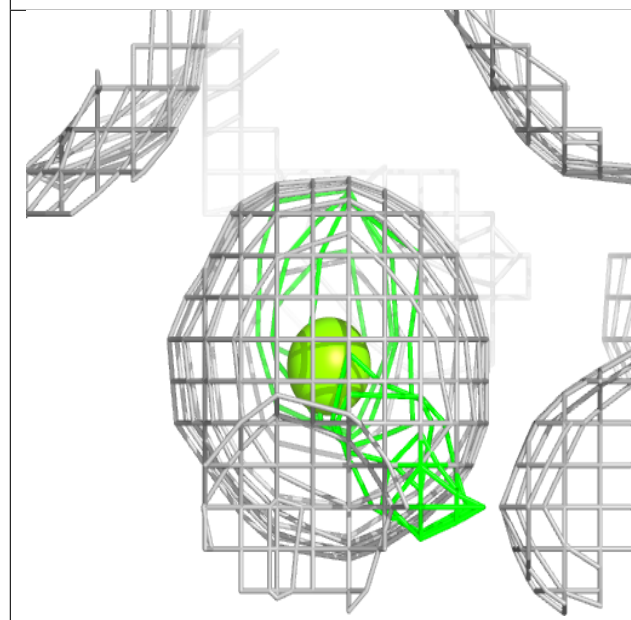
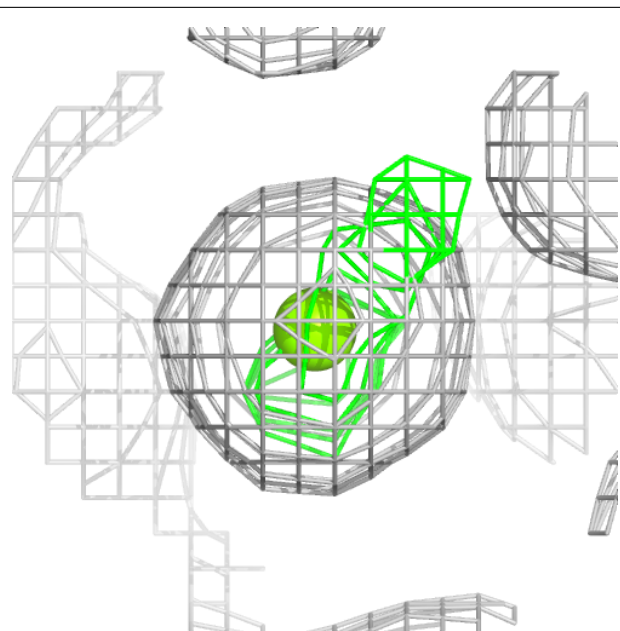
**Electron density around MG A 303:**

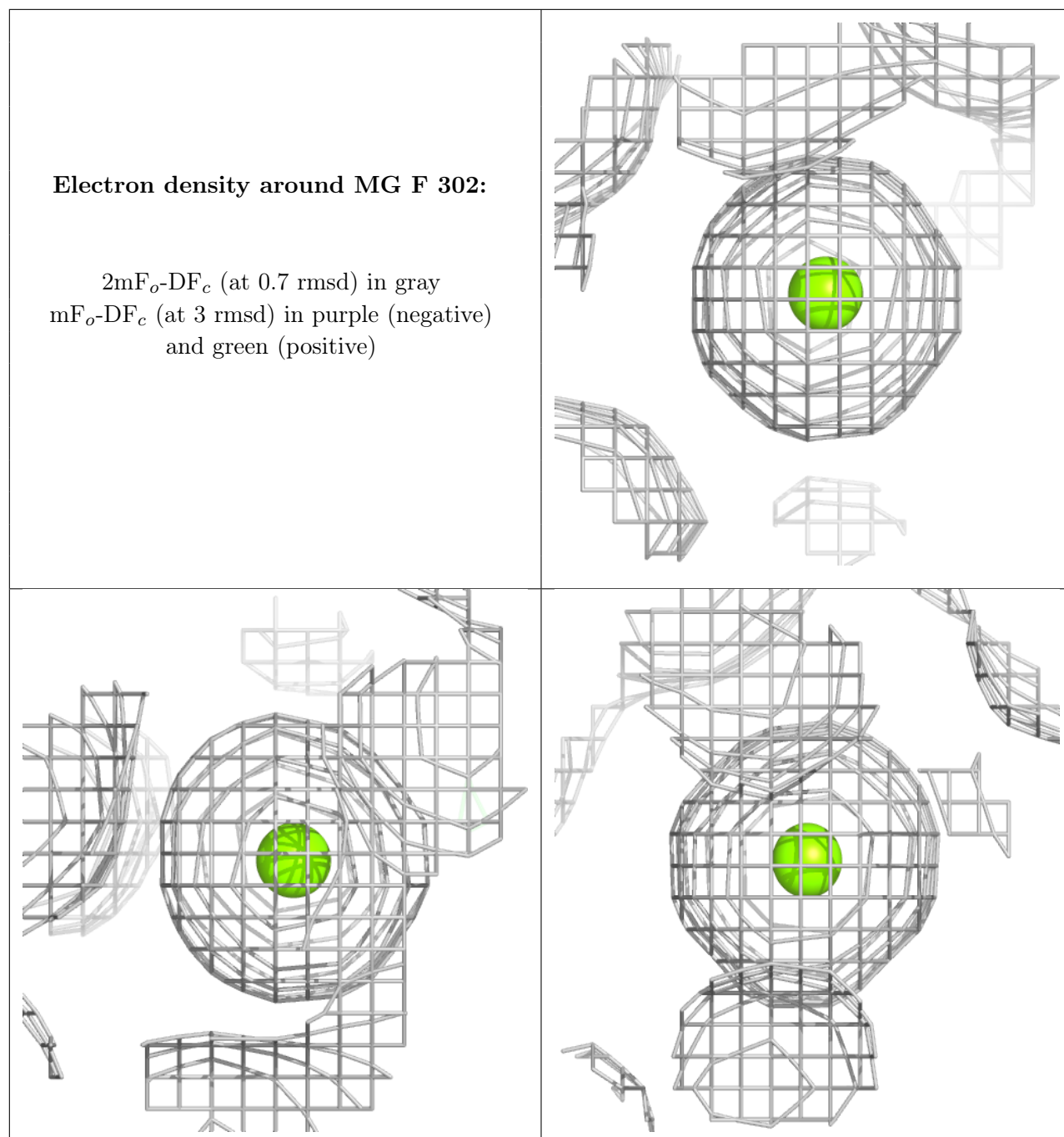
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around MG C 302:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





## 6.5 Other polymers [i](#)

There are no such residues in this entry.