W O R L D W I D E
wwPDB
P R O T E I N   D A T A   B A N K

wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 26, 2026 – 10:10 AM JST

PDB ID	:	9UG7 / pdb_00009ug7
Title	:	Structure of sulfonamide synthase SbzM from Actinokineospora mzabensis
Authors	:	Zhu, Y.; Mori, T.; Abe, I.
Deposited on	:	2025-04-11
Resolution	:	1.94 Å(reported)

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	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
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)	:	2.48.1

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 1.94 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.
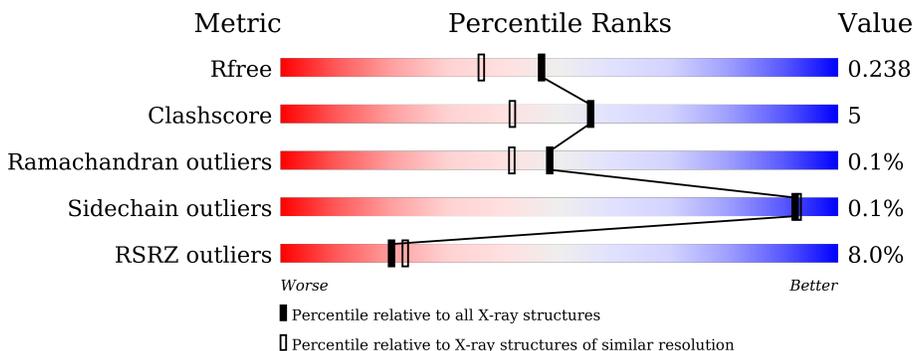
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	1306 (1.94-1.94)
Clashscore	180529	1400 (1.94-1.94)
Ramachandran outliers	177936	1387 (1.94-1.94)
Sidechain outliers	177891	1387 (1.94-1.94)
RSRZ outliers	164620	1306 (1.94-1.94)

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 >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	215	4% / 70% 11% 19%
1	B	215	8% / 69% 12% 19%
1	C	215	6% / 72% 9% 20%
1	D	215	3% / 79% · 19%
1	E	215	11% / 68% 12% 20%
1	F	215	7% / 75% 7% 19%

2 Entry composition ⓘ

There are 6 unique types of molecules in this entry. The entry contains 8017 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 Cupin type-2 domain-containing protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	174	Total	C	N	O	S	0	2	0
			1270	796	230	234	10			
1	F	175	Total	C	N	O	S	0	0	0
			1242	781	222	230	9			
1	D	175	Total	C	N	O	S	0	1	0
			1260	793	223	235	9			
1	B	174	Total	C	N	O	S	0	0	0
			1249	784	221	235	9			
1	C	173	Total	C	N	O	S	0	0	0
			1245	782	220	234	9			
1	E	173	Total	C	N	O	S	0	0	0
			1245	782	220	234	9			

There are 156 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MET	-	initiating methionine	UNP A0A8E2X4A6
A	2	LYS	-	expression tag	UNP A0A8E2X4A6
A	3	HIS	-	expression tag	UNP A0A8E2X4A6
A	4	HIS	-	expression tag	UNP A0A8E2X4A6
A	5	HIS	-	expression tag	UNP A0A8E2X4A6
A	6	HIS	-	expression tag	UNP A0A8E2X4A6
A	7	HIS	-	expression tag	UNP A0A8E2X4A6
A	8	HIS	-	expression tag	UNP A0A8E2X4A6
A	9	HIS	-	expression tag	UNP A0A8E2X4A6
A	10	SER	-	expression tag	UNP A0A8E2X4A6
A	11	ASP	-	expression tag	UNP A0A8E2X4A6
A	12	TYR	-	expression tag	UNP A0A8E2X4A6
A	13	ASP	-	expression tag	UNP A0A8E2X4A6
A	14	ILE	-	expression tag	UNP A0A8E2X4A6
A	15	PRO	-	expression tag	UNP A0A8E2X4A6
A	16	THR	-	expression tag	UNP A0A8E2X4A6
A	17	THR	-	expression tag	UNP A0A8E2X4A6

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Chain	Residue	Modelled	Actual	Comment	Reference
A	18	GLU	-	expression tag	UNP A0A8E2X4A6
A	19	ASN	-	expression tag	UNP A0A8E2X4A6
A	20	LEU	-	expression tag	UNP A0A8E2X4A6
A	21	TYR	-	expression tag	UNP A0A8E2X4A6
A	22	PHE	-	expression tag	UNP A0A8E2X4A6
A	23	GLN	-	expression tag	UNP A0A8E2X4A6
A	24	GLY	-	expression tag	UNP A0A8E2X4A6
A	25	SER	-	expression tag	UNP A0A8E2X4A6
A	26	VAL	-	expression tag	UNP A0A8E2X4A6
F	1	MET	-	initiating methionine	UNP A0A8E2X4A6
F	2	LYS	-	expression tag	UNP A0A8E2X4A6
F	3	HIS	-	expression tag	UNP A0A8E2X4A6
F	4	HIS	-	expression tag	UNP A0A8E2X4A6
F	5	HIS	-	expression tag	UNP A0A8E2X4A6
F	6	HIS	-	expression tag	UNP A0A8E2X4A6
F	7	HIS	-	expression tag	UNP A0A8E2X4A6
F	8	HIS	-	expression tag	UNP A0A8E2X4A6
F	9	HIS	-	expression tag	UNP A0A8E2X4A6
F	10	SER	-	expression tag	UNP A0A8E2X4A6
F	11	ASP	-	expression tag	UNP A0A8E2X4A6
F	12	TYR	-	expression tag	UNP A0A8E2X4A6
F	13	ASP	-	expression tag	UNP A0A8E2X4A6
F	14	ILE	-	expression tag	UNP A0A8E2X4A6
F	15	PRO	-	expression tag	UNP A0A8E2X4A6
F	16	THR	-	expression tag	UNP A0A8E2X4A6
F	17	THR	-	expression tag	UNP A0A8E2X4A6
F	18	GLU	-	expression tag	UNP A0A8E2X4A6
F	19	ASN	-	expression tag	UNP A0A8E2X4A6
F	20	LEU	-	expression tag	UNP A0A8E2X4A6
F	21	TYR	-	expression tag	UNP A0A8E2X4A6
F	22	PHE	-	expression tag	UNP A0A8E2X4A6
F	23	GLN	-	expression tag	UNP A0A8E2X4A6
F	24	GLY	-	expression tag	UNP A0A8E2X4A6
F	25	SER	-	expression tag	UNP A0A8E2X4A6
F	26	VAL	-	expression tag	UNP A0A8E2X4A6
D	1	MET	-	initiating methionine	UNP A0A8E2X4A6
D	2	LYS	-	expression tag	UNP A0A8E2X4A6
D	3	HIS	-	expression tag	UNP A0A8E2X4A6
D	4	HIS	-	expression tag	UNP A0A8E2X4A6
D	5	HIS	-	expression tag	UNP A0A8E2X4A6
D	6	HIS	-	expression tag	UNP A0A8E2X4A6
D	7	HIS	-	expression tag	UNP A0A8E2X4A6

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Chain	Residue	Modelled	Actual	Comment	Reference
D	8	HIS	-	expression tag	UNP A0A8E2X4A6
D	9	HIS	-	expression tag	UNP A0A8E2X4A6
D	10	SER	-	expression tag	UNP A0A8E2X4A6
D	11	ASP	-	expression tag	UNP A0A8E2X4A6
D	12	TYR	-	expression tag	UNP A0A8E2X4A6
D	13	ASP	-	expression tag	UNP A0A8E2X4A6
D	14	ILE	-	expression tag	UNP A0A8E2X4A6
D	15	PRO	-	expression tag	UNP A0A8E2X4A6
D	16	THR	-	expression tag	UNP A0A8E2X4A6
D	17	THR	-	expression tag	UNP A0A8E2X4A6
D	18	GLU	-	expression tag	UNP A0A8E2X4A6
D	19	ASN	-	expression tag	UNP A0A8E2X4A6
D	20	LEU	-	expression tag	UNP A0A8E2X4A6
D	21	TYR	-	expression tag	UNP A0A8E2X4A6
D	22	PHE	-	expression tag	UNP A0A8E2X4A6
D	23	GLN	-	expression tag	UNP A0A8E2X4A6
D	24	GLY	-	expression tag	UNP A0A8E2X4A6
D	25	SER	-	expression tag	UNP A0A8E2X4A6
D	26	VAL	-	expression tag	UNP A0A8E2X4A6
B	1	MET	-	initiating methionine	UNP A0A8E2X4A6
B	2	LYS	-	expression tag	UNP A0A8E2X4A6
B	3	HIS	-	expression tag	UNP A0A8E2X4A6
B	4	HIS	-	expression tag	UNP A0A8E2X4A6
B	5	HIS	-	expression tag	UNP A0A8E2X4A6
B	6	HIS	-	expression tag	UNP A0A8E2X4A6
B	7	HIS	-	expression tag	UNP A0A8E2X4A6
B	8	HIS	-	expression tag	UNP A0A8E2X4A6
B	9	HIS	-	expression tag	UNP A0A8E2X4A6
B	10	SER	-	expression tag	UNP A0A8E2X4A6
B	11	ASP	-	expression tag	UNP A0A8E2X4A6
B	12	TYR	-	expression tag	UNP A0A8E2X4A6
B	13	ASP	-	expression tag	UNP A0A8E2X4A6
B	14	ILE	-	expression tag	UNP A0A8E2X4A6
B	15	PRO	-	expression tag	UNP A0A8E2X4A6
B	16	THR	-	expression tag	UNP A0A8E2X4A6
B	17	THR	-	expression tag	UNP A0A8E2X4A6
B	18	GLU	-	expression tag	UNP A0A8E2X4A6
B	19	ASN	-	expression tag	UNP A0A8E2X4A6
B	20	LEU	-	expression tag	UNP A0A8E2X4A6
B	21	TYR	-	expression tag	UNP A0A8E2X4A6
B	22	PHE	-	expression tag	UNP A0A8E2X4A6
B	23	GLN	-	expression tag	UNP A0A8E2X4A6

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Chain	Residue	Modelled	Actual	Comment	Reference
B	24	GLY	-	expression tag	UNP A0A8E2X4A6
B	25	SER	-	expression tag	UNP A0A8E2X4A6
B	26	VAL	-	expression tag	UNP A0A8E2X4A6
C	1	MET	-	initiating methionine	UNP A0A8E2X4A6
C	2	LYS	-	expression tag	UNP A0A8E2X4A6
C	3	HIS	-	expression tag	UNP A0A8E2X4A6
C	4	HIS	-	expression tag	UNP A0A8E2X4A6
C	5	HIS	-	expression tag	UNP A0A8E2X4A6
C	6	HIS	-	expression tag	UNP A0A8E2X4A6
C	7	HIS	-	expression tag	UNP A0A8E2X4A6
C	8	HIS	-	expression tag	UNP A0A8E2X4A6
C	9	HIS	-	expression tag	UNP A0A8E2X4A6
C	10	SER	-	expression tag	UNP A0A8E2X4A6
C	11	ASP	-	expression tag	UNP A0A8E2X4A6
C	12	TYR	-	expression tag	UNP A0A8E2X4A6
C	13	ASP	-	expression tag	UNP A0A8E2X4A6
C	14	ILE	-	expression tag	UNP A0A8E2X4A6
C	15	PRO	-	expression tag	UNP A0A8E2X4A6
C	16	THR	-	expression tag	UNP A0A8E2X4A6
C	17	THR	-	expression tag	UNP A0A8E2X4A6
C	18	GLU	-	expression tag	UNP A0A8E2X4A6
C	19	ASN	-	expression tag	UNP A0A8E2X4A6
C	20	LEU	-	expression tag	UNP A0A8E2X4A6
C	21	TYR	-	expression tag	UNP A0A8E2X4A6
C	22	PHE	-	expression tag	UNP A0A8E2X4A6
C	23	GLN	-	expression tag	UNP A0A8E2X4A6
C	24	GLY	-	expression tag	UNP A0A8E2X4A6
C	25	SER	-	expression tag	UNP A0A8E2X4A6
C	26	VAL	-	expression tag	UNP A0A8E2X4A6
E	1	MET	-	initiating methionine	UNP A0A8E2X4A6
E	2	LYS	-	expression tag	UNP A0A8E2X4A6
E	3	HIS	-	expression tag	UNP A0A8E2X4A6
E	4	HIS	-	expression tag	UNP A0A8E2X4A6
E	5	HIS	-	expression tag	UNP A0A8E2X4A6
E	6	HIS	-	expression tag	UNP A0A8E2X4A6
E	7	HIS	-	expression tag	UNP A0A8E2X4A6
E	8	HIS	-	expression tag	UNP A0A8E2X4A6
E	9	HIS	-	expression tag	UNP A0A8E2X4A6
E	10	SER	-	expression tag	UNP A0A8E2X4A6
E	11	ASP	-	expression tag	UNP A0A8E2X4A6
E	12	TYR	-	expression tag	UNP A0A8E2X4A6
E	13	ASP	-	expression tag	UNP A0A8E2X4A6

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Chain	Residue	Modelled	Actual	Comment	Reference
E	14	ILE	-	expression tag	UNP A0A8E2X4A6
E	15	PRO	-	expression tag	UNP A0A8E2X4A6
E	16	THR	-	expression tag	UNP A0A8E2X4A6
E	17	THR	-	expression tag	UNP A0A8E2X4A6
E	18	GLU	-	expression tag	UNP A0A8E2X4A6
E	19	ASN	-	expression tag	UNP A0A8E2X4A6
E	20	LEU	-	expression tag	UNP A0A8E2X4A6
E	21	TYR	-	expression tag	UNP A0A8E2X4A6
E	22	PHE	-	expression tag	UNP A0A8E2X4A6
E	23	GLN	-	expression tag	UNP A0A8E2X4A6
E	24	GLY	-	expression tag	UNP A0A8E2X4A6
E	25	SER	-	expression tag	UNP A0A8E2X4A6
E	26	VAL	-	expression tag	UNP A0A8E2X4A6

- Molecule 2 is OXYGEN MOLECULE (CCD ID: OXY) (formula: O_2) (labeled as "Ligand of Interest" by depositor).
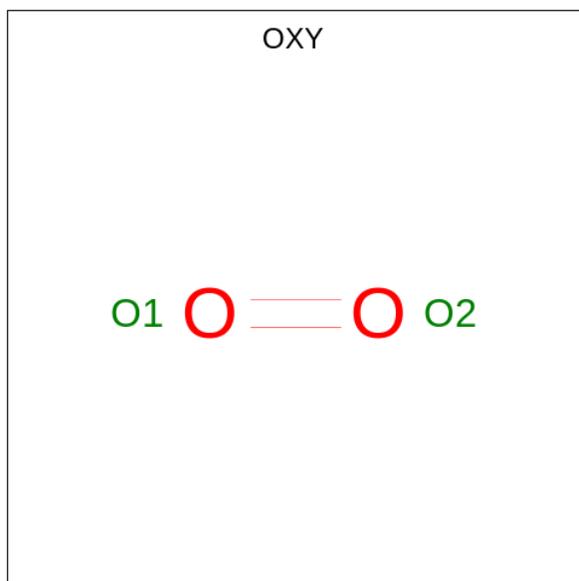
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total 2	O 2	0	0
2	F	1	Total 2	O 2	0	0
2	D	1	Total 2	O 2	0	0
2	B	1	Total 2	O 2	0	0

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

- Molecule 3 is ZINC ION (CCD ID: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

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

- Molecule 4 is NICKEL (II) ION (CCD ID: NI) (formula: Ni) (labeled as "Ligand of Interest" by depositor).

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

- Molecule 5 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	F	1	Total Cl 1　　1		0	0

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	91	Total　O 91　　91		0	0
6	F	93	Total　O 93　　93		0	0
6	D	91	Total　O 91　　91		0	0
6	B	64	Total　O 64　　64		0	0
6	C	75	Total　O 75　　75		0	0
6	E	61	Total　O 61　　61		0	0

3 Residue-property plots ⓘ

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: Cupin type-2 domain-containing protein

• Molecule 1: Cupin type-2 domain-containing protein

• Molecule 1: Cupin type-2 domain-containing protein

• Molecule 1: Cupin type-2 domain-containing protein

R91 G105 I118 G122 K123 V124 E136 A142 P157 R166 V170 P171 Y172 E173 E174 V175 I176 A177 C184 A191 L192 A193 P194 A195 A199 V211 G212 VAL ALA PRO

• Molecule 1: Cupin type-2 domain-containing protein

Chain C:

6%

72%   9%   20%

MET LYS HIS HIS HIS HIS HIS HIS SER ASP TYR ASP ILE PRO THR THR GLU ASN LEU TYR PHE GLN GLY SER VAL PRO HIS GLU THR ARG PRO PRO ARG THR SER ALA PRO A39 W45 E49 L50 D51 D52 T56 P65 A71 V72 G73 A74 R77 E78 I82

D88 L89 A129 D138 Y172 I176 A177 P178 D179 L182 L192 A193 P194 A195 K196 T209 C210 V211 GLY VAL ALA PRO

• Molecule 1: Cupin type-2 domain-containing protein

Chain E:

11%

68%   12%   20%

MET LYS HIS HIS HIS HIS HIS HIS SER ASP TYR ASP ILE PRO THR THR GLU ASN LEU TYR PHE GLN GLY SER VAL PRO HIS GLU THR ARG PRO PRO ARG THR SER ALA PRO A39 L50 D51 D52 E53 T56 L57 R58 V59 A60 H61 G62 G70 A71 V72 R91 S96

L109 V112 I118 E126 Y133 A142 D148 H149 V150 V161 R166 V170 E174 V175 I176 A177 P178 D179 G180 D181 I186 V189 T190 A191 L192 A193 P194 A195 K196 L197 H198 A199 V211 GLY VAL ALA PRO

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	75.62Å 75.97Å 105.03Å 90.00° 103.19° 90.00°	Depositor
Resolution (Å)	47.36 – 1.94 47.36 – 1.94	Depositor EDS
% Data completeness (in resolution range)	95.4 (47.36-1.94) 95.4 (47.36-1.94)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.64 (at 1.94Å)	Xtriage
Refinement program	PHENIX 1.21.1_5286	Depositor
R, R_{free}	0.203 , 0.238 0.203 , 0.238	Depositor DCC
R_{free} test set	1916 reflections (2.23%)	wwPDB-VP
Wilson B-factor (Å^2)	26.3	Xtriage
Anisotropy	0.111	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 33.8	EDS
L-test for twinning[2]	$< |L| > = 0.47, < L^2 > = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	8017	wwPDB-VP
Average B, all atoms (Å^2)	31.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 9.95% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ 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: OXY, ZN, CL, NI

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	0.32	0/1302	0.53	0/1786
1	B	0.27	0/1281	0.49	0/1760
1	C	0.30	0/1277	0.51	0/1755
1	D	0.30	0/1292	0.50	0/1776
1	E	0.28	0/1277	0.50	0/1755
1	F	0.35	0/1274	0.53	0/1752
All	All	0.30	0/7703	0.51	0/10584

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.
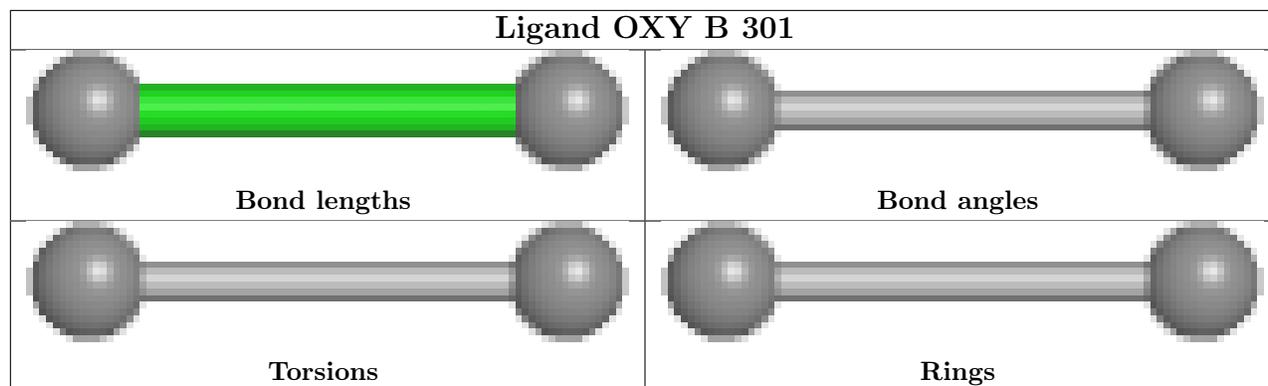
5.2 Too-close contacts (i)

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	1270	0	1236	17	0
1	B	1249	0	1215	17	0
1	C	1245	0	1212	12	0
1	D	1260	0	1230	3	0
1	E	1245	0	1212	18	0
1	F	1242	0	1205	10	0
2	A	2	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	2	0	0	0	0
2	C	2	0	0	0	0
2	D	2	0	0	0	0
2	E	2	0	0	0	0
2	F	2	0	0	0	0
3	A	2	0	0	0	0
3	B	2	0	0	0	0
3	C	2	0	0	0	0
3	D	2	0	0	0	0
3	E	2	0	0	0	0
3	F	2	0	0	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
4	E	1	0	0	0	0
4	F	1	0	0	0	0
5	F	1	0	0	1	0
6	A	91	0	0	2	0
6	B	64	0	0	1	0
6	C	75	0	0	0	0
6	D	91	0	0	0	0
6	E	61	0	0	2	0
6	F	93	0	0	1	0
All	All	8017	0	7310	68	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 5.

The worst 5 of 68 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:F:56:THR:HG23	1:E:56:THR:HG23	1.72	0.72
1:C:176:ILE:HD13	1:C:182:LEU:HB2	1.72	0.71
1:C:49:GLU:HG3	1:C:56:THR:HB	1.74	0.69
1:E:61:HIS:O	1:E:91:ARG:NH1	2.26	0.66
1:E:61:HIS:O	1:E:91:ARG:HD2	1.97	0.64

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	175/215 (81%)	173 (99%)	2 (1%)	0	100	100
1	B	172/215 (80%)	168 (98%)	4 (2%)	0	100	100
1	C	171/215 (80%)	169 (99%)	2 (1%)	0	100	100
1	D	174/215 (81%)	170 (98%)	3 (2%)	1 (1%)	22	12
1	E	171/215 (80%)	164 (96%)	7 (4%)	0	100	100
1	F	173/215 (80%)	172 (99%)	1 (1%)	0	100	100
All	All	1036/1290 (80%)	1016 (98%)	19 (2%)	1 (0%)	48	41

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	52	ASP

5.3.2 Protein sidechains ⓘ

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	129/168 (77%)	129 (100%)	0	100	100
1	B	129/168 (77%)	129 (100%)	0	100	100
1	C	129/168 (77%)	129 (100%)	0	100	100
1	D	130/168 (77%)	130 (100%)	0	100	100
1	E	129/168 (77%)	128 (99%)	1 (1%)	79	76
1	F	126/168 (75%)	126 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	772/1008 (77%)	771 (100%)	1 (0%)	92 93

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	59	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 8 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	128	ASN
1	E	41	ASN
1	C	99	GLN
1	B	128	ASN
1	C	128	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 25 ligands modelled in this entry, 19 are monoatomic - leaving 6 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
2	OXY	C	301	4	1,1,1	0.19	0	-		
2	OXY	E	301	4	1,1,1	0.15	0	-		
2	OXY	F	301	4	1,1,1	0.12	0	-		
2	OXY	D	301	4	1,1,1	0.19	0	-		
2	OXY	A	301	4	1,1,1	0.22	0	-		
2	OXY	B	301	4	1,1,1	0.19	0	-		

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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

Ligand OXY C 301

Bond lengths   Bond angles

Torsions   Rings

Ligand OXY E 301

Bond lengths

Bond angles

Torsions

Rings

Ligand OXY F 301

Bond lengths

Bond angles

Torsions

Rings

Ligand OXY D 301

Bond lengths

Bond angles

Torsions

Rings

Ligand OXY A 301

Bond lengths

Bond angles

Torsions

Rings

Ligand OXY B 301

Bond lengths

Bond angles

Torsions

Rings
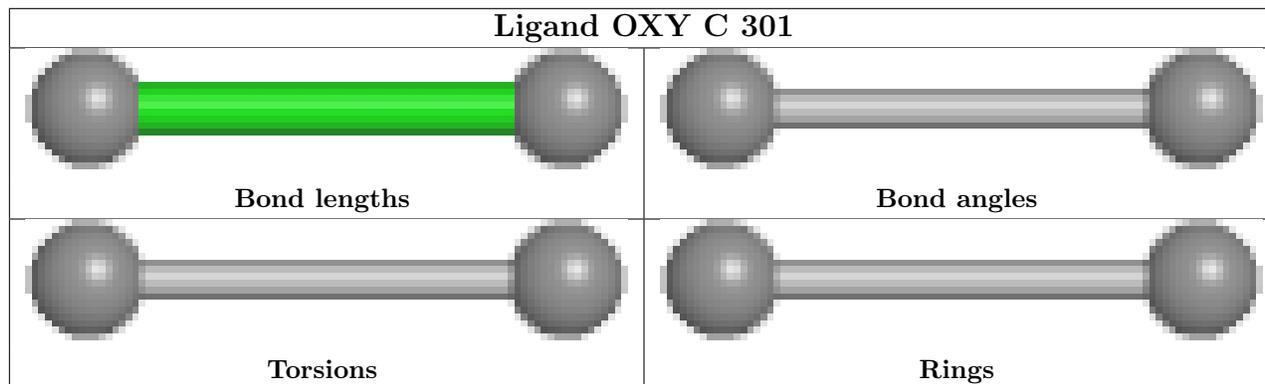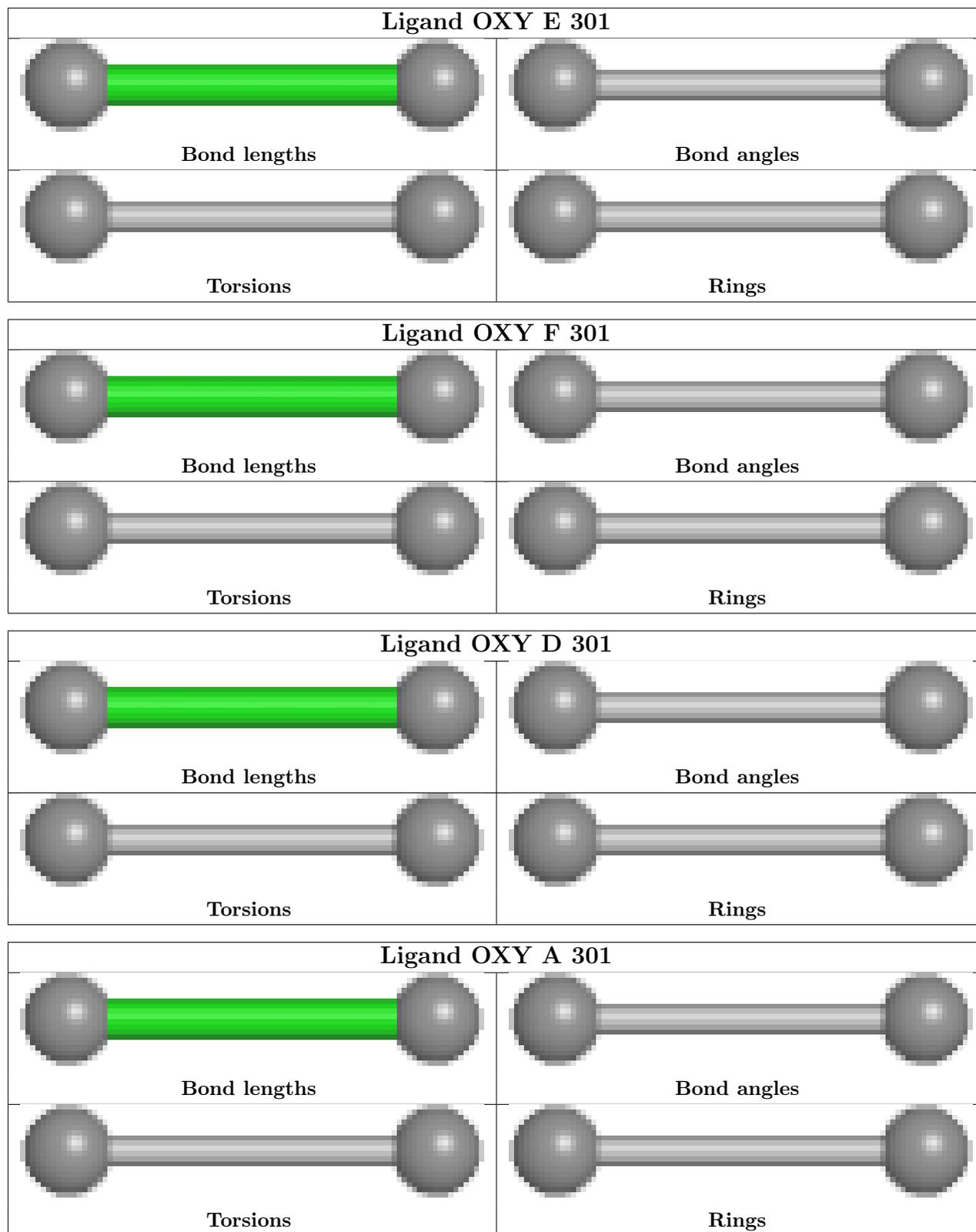
5.7 Other polymers ⓘ

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 ⓘ

6.1 Protein, DNA and RNA chains ⓘ

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, 95th 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^2)	Q<0.9
1	A	174/215 (80%)	0.23	8 (4%)	38	42	8, 26, 44, 79	2 (1%)
1	B	174/215 (80%)	0.62	18 (10%)	13	16	21, 32, 49, 68	0
1	C	173/215 (80%)	0.32	12 (6%)	24	27	19, 28, 46, 63	0
1	D	175/215 (81%)	0.14	7 (4%)	43	47	14, 27, 42, 60	1 (0%)
1	E	173/215 (80%)	0.82	24 (13%)	7	9	20, 34, 58, 70	0
1	F	175/215 (81%)	0.31	14 (8%)	20	22	19, 25, 48, 80	0
All	All	1044/1290 (80%)	0.41	83 (7%)	20	22	8, 28, 50, 80	3 (0%)

The worst 5 of 83 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	50	LEU	7.7
1	F	52	ASP	6.2
1	F	55	THR	6.2
1	B	193	ALA	6.1
1	E	193	ALA	5.7

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

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

6.3 Carbohydrates ⓘ

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, 95th 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^2)	Q<0.9
2	OXY	D	301	2/2	0.95	0.09	19,19,19,33	0
5	CL	F	305	1/1	0.96	0.08	34,34,34,34	0
2	OXY	B	301	2/2	0.97	0.10	23,23,23,28	0
2	OXY	C	301	2/2	0.97	0.07	23,23,23,24	0
2	OXY	E	301	2/2	0.97	0.13	18,18,18,42	0
2	OXY	A	301	2/2	0.97	0.08	18,18,18,30	0
3	ZN	E	303	1/1	0.98	0.04	44,44,44,44	0
2	OXY	F	301	2/2	0.98	0.07	17,17,17,33	0
3	ZN	F	302	1/1	0.99	0.03	23,23,23,23	0
3	ZN	F	303	1/1	0.99	0.02	25,25,25,25	0
3	ZN	D	303	1/1	0.99	0.03	26,26,26,26	0
3	ZN	B	302	1/1	0.99	0.03	31,31,31,31	0
3	ZN	B	303	1/1	0.99	0.04	38,38,38,38	0
3	ZN	C	303	1/1	0.99	0.03	38,38,38,38	0
3	ZN	E	302	1/1	0.99	0.03	35,35,35,35	0
3	ZN	A	302	1/1	0.99	0.02	25,25,25,25	0
4	NI	A	304	1/1	0.99	0.03	22,22,22,22	0
4	NI	E	304	1/1	0.99	0.02	29,29,29,29	0
3	ZN	A	303	1/1	0.99	0.03	27,27,27,27	0
4	NI	F	304	1/1	1.00	0.02	19,19,19,19	0
4	NI	D	304	1/1	1.00	0.02	20,20,20,20	0
4	NI	B	304	1/1	1.00	0.01	24,24,24,24	0
4	NI	C	304	1/1	1.00	0.01	24,24,24,24	0
3	ZN	D	302	1/1	1.00	0.02	30,30,30,30	0
3	ZN	C	302	1/1	1.00	0.02	35,35,35,35	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 OXY D 301:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
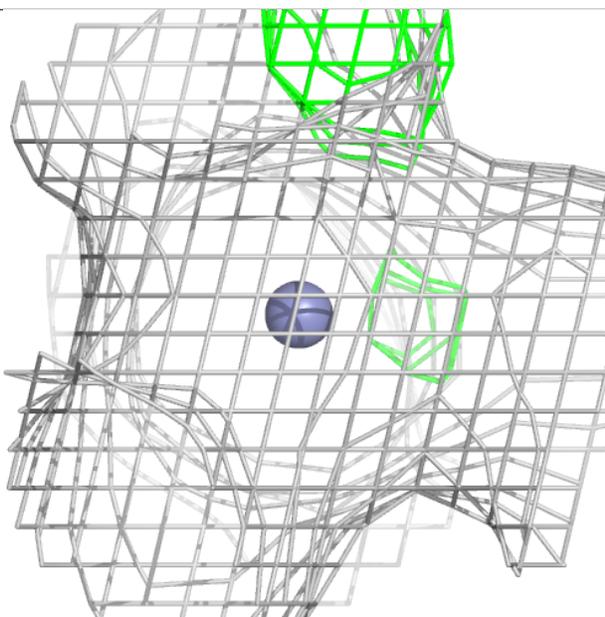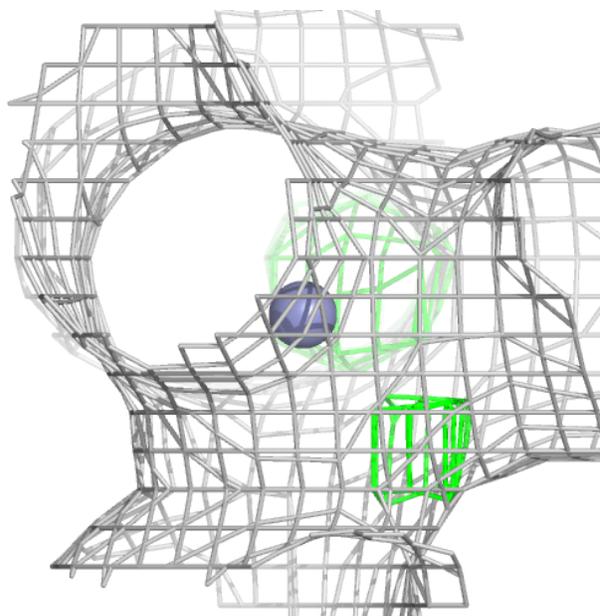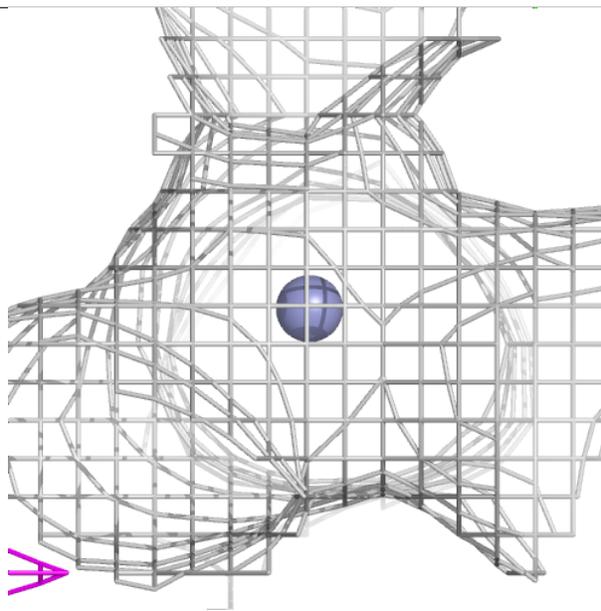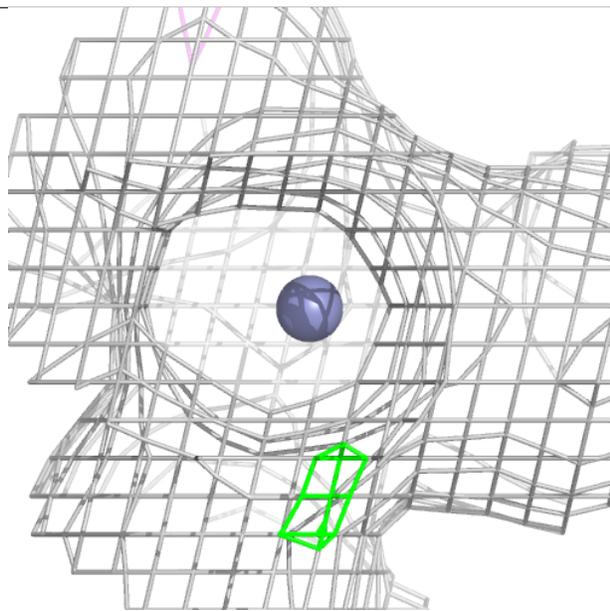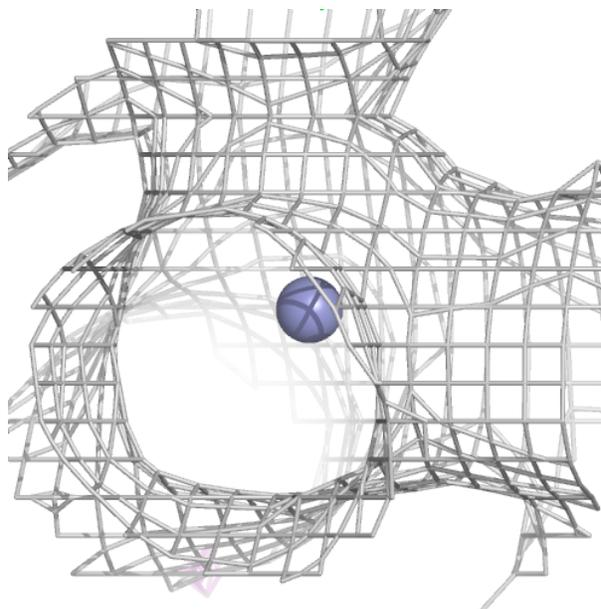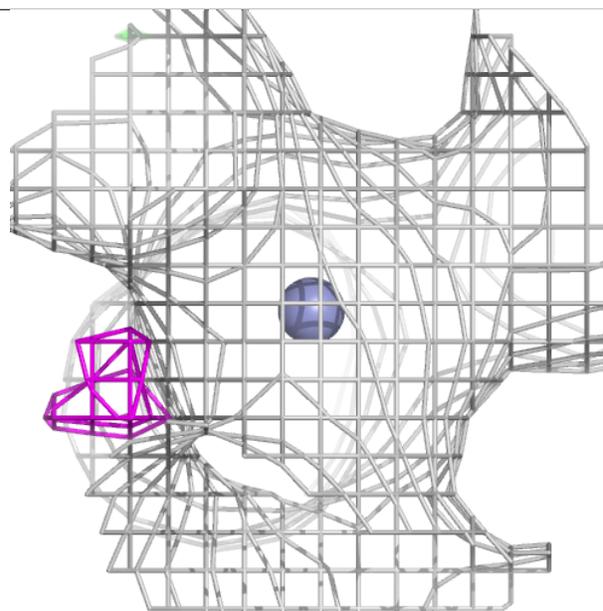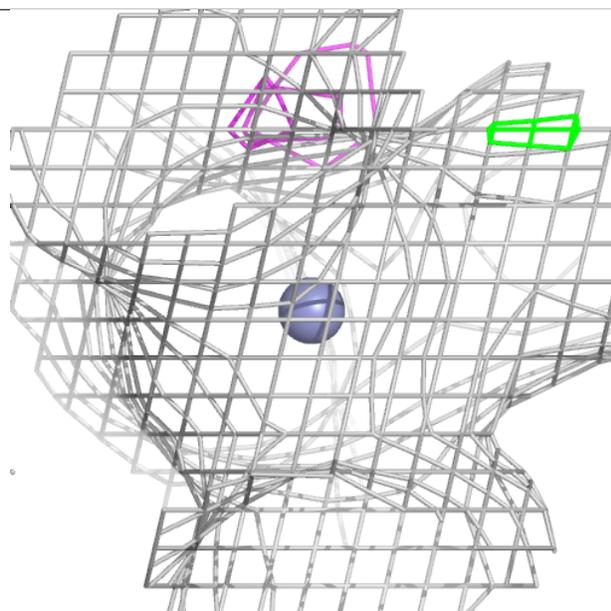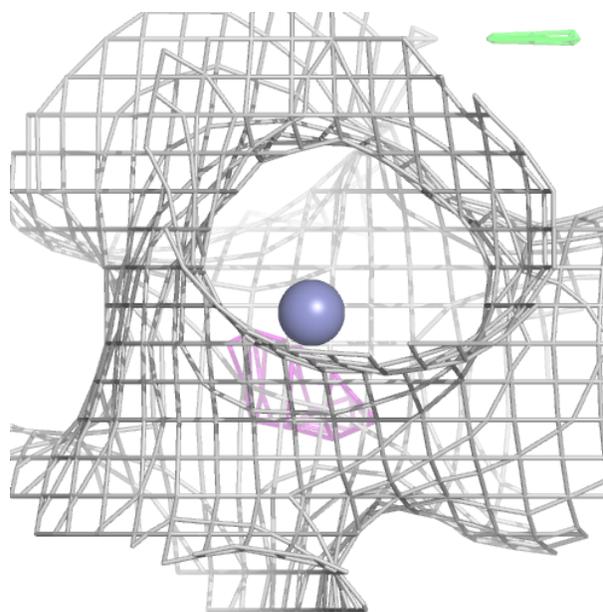mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
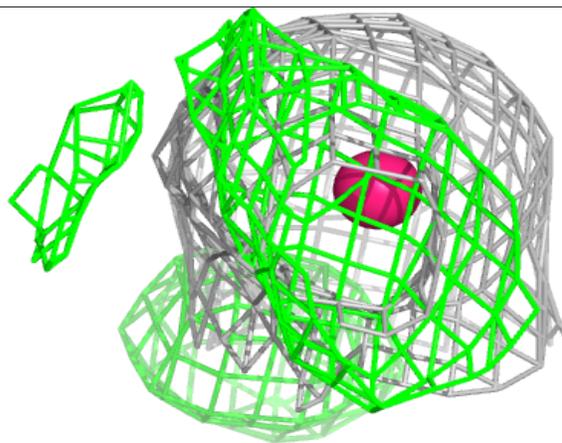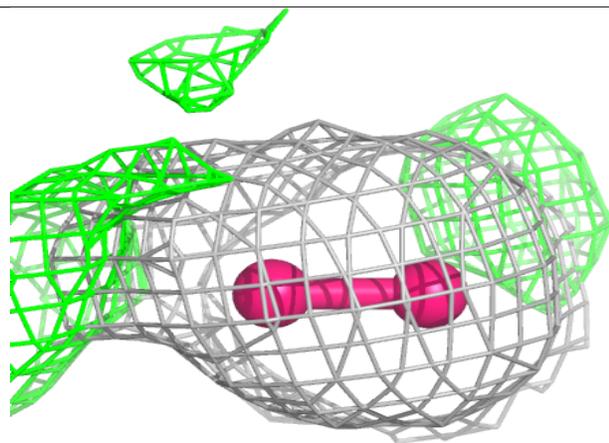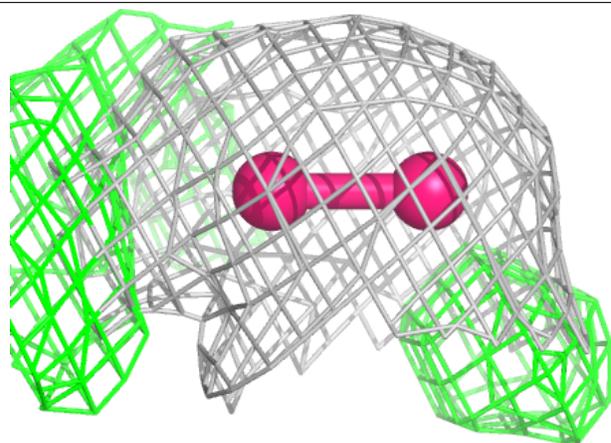
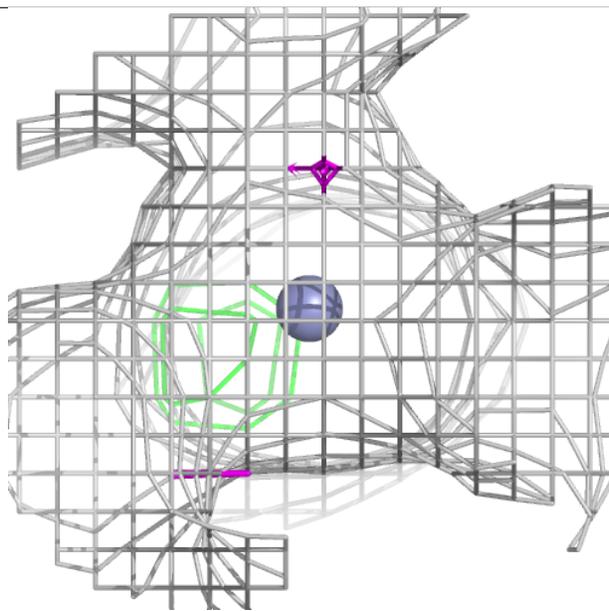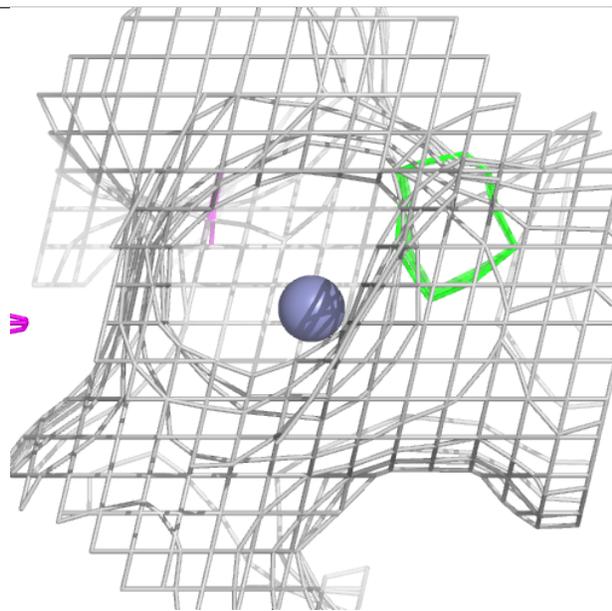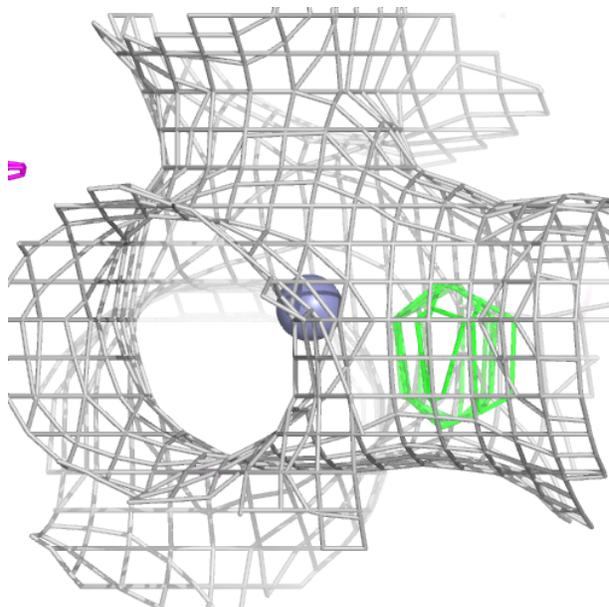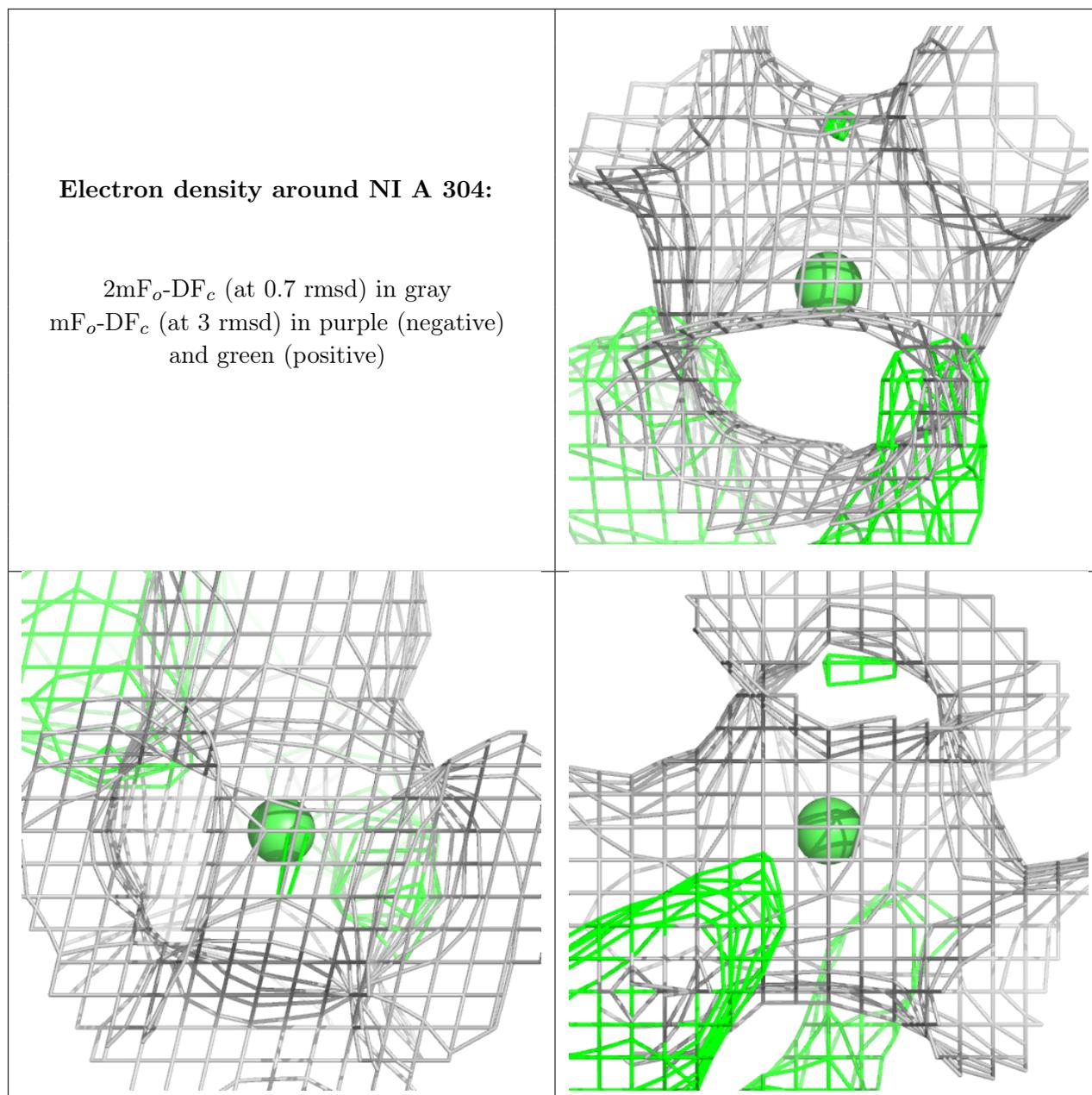**Electron density around OXY B 301:**

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mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
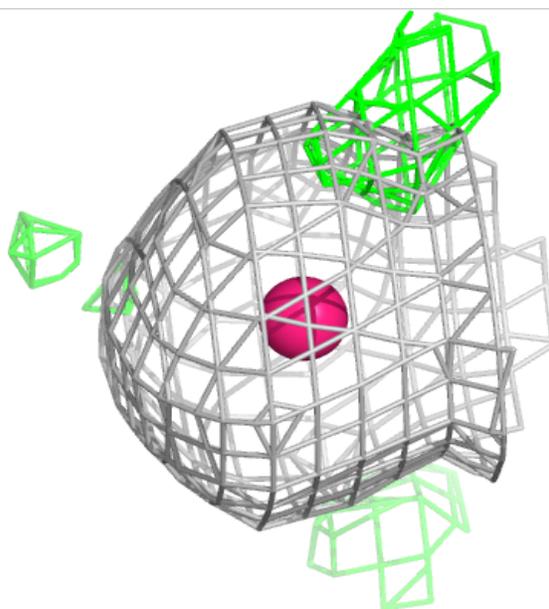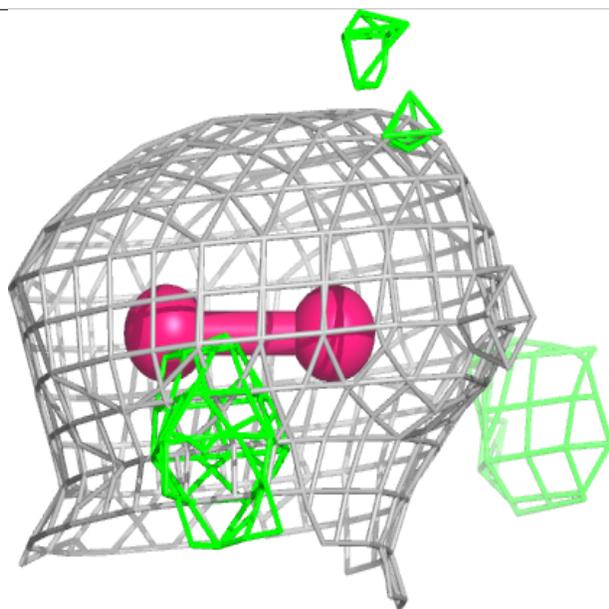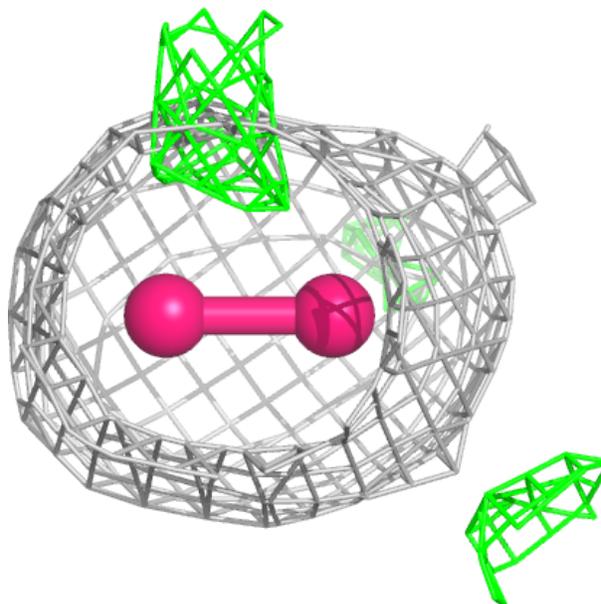
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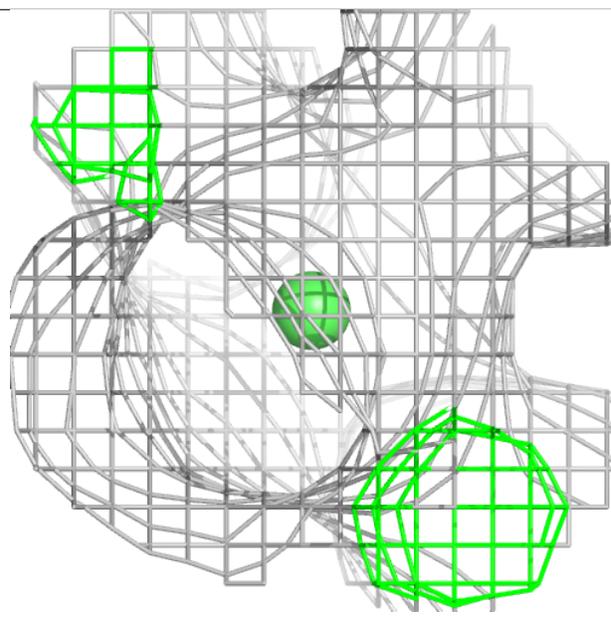and green (positive)
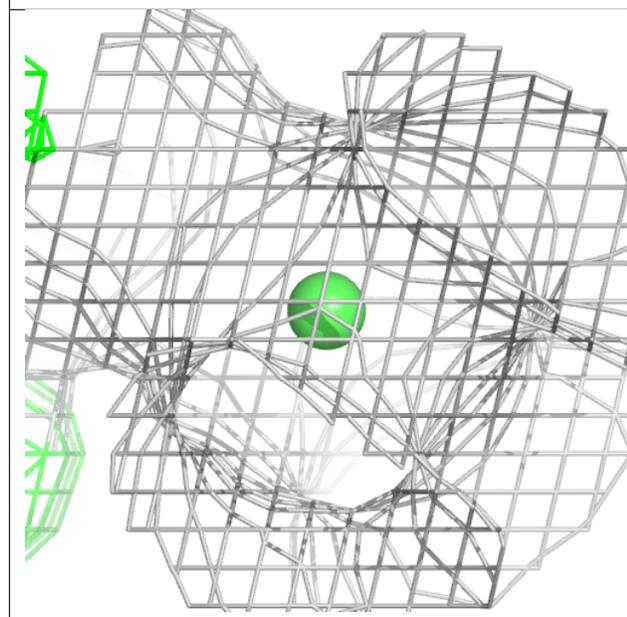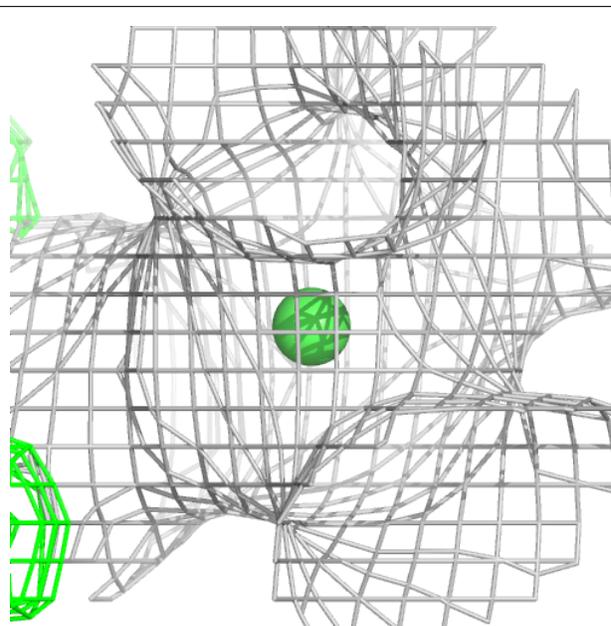
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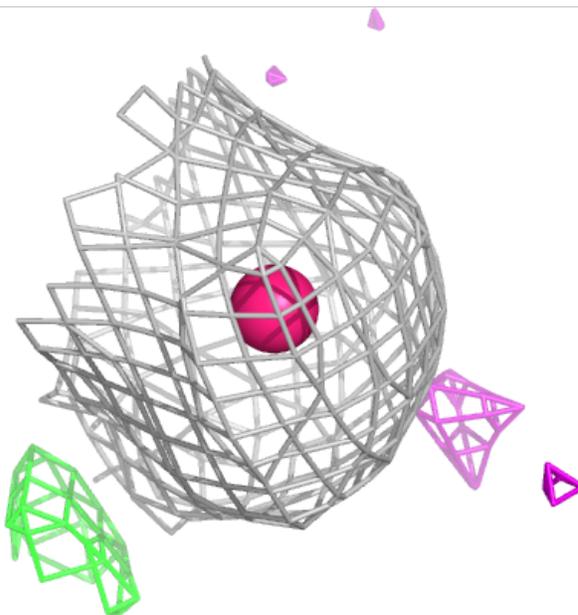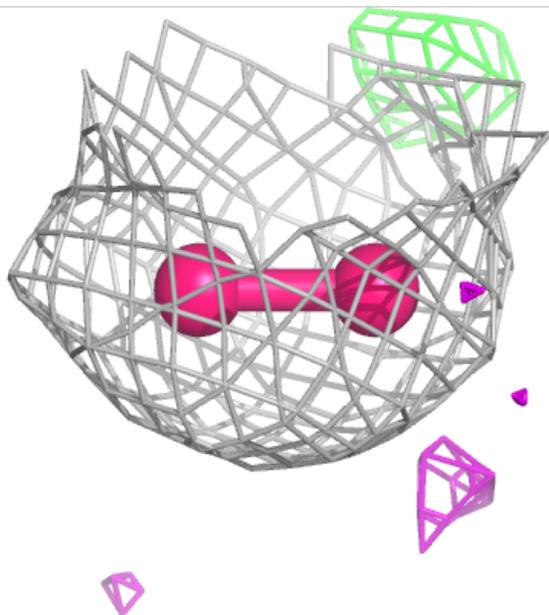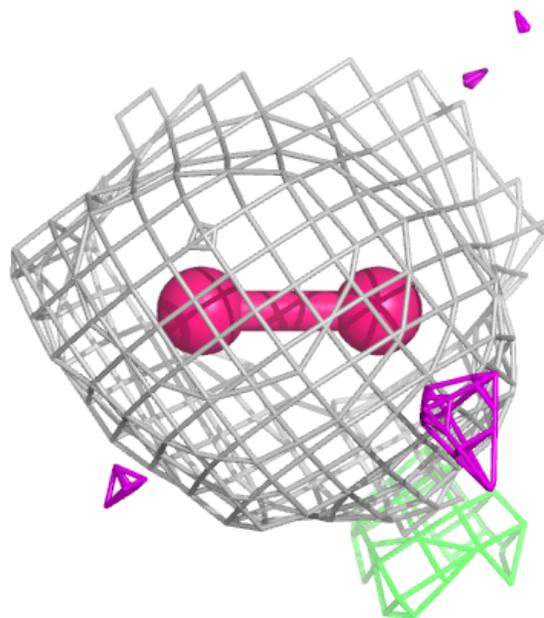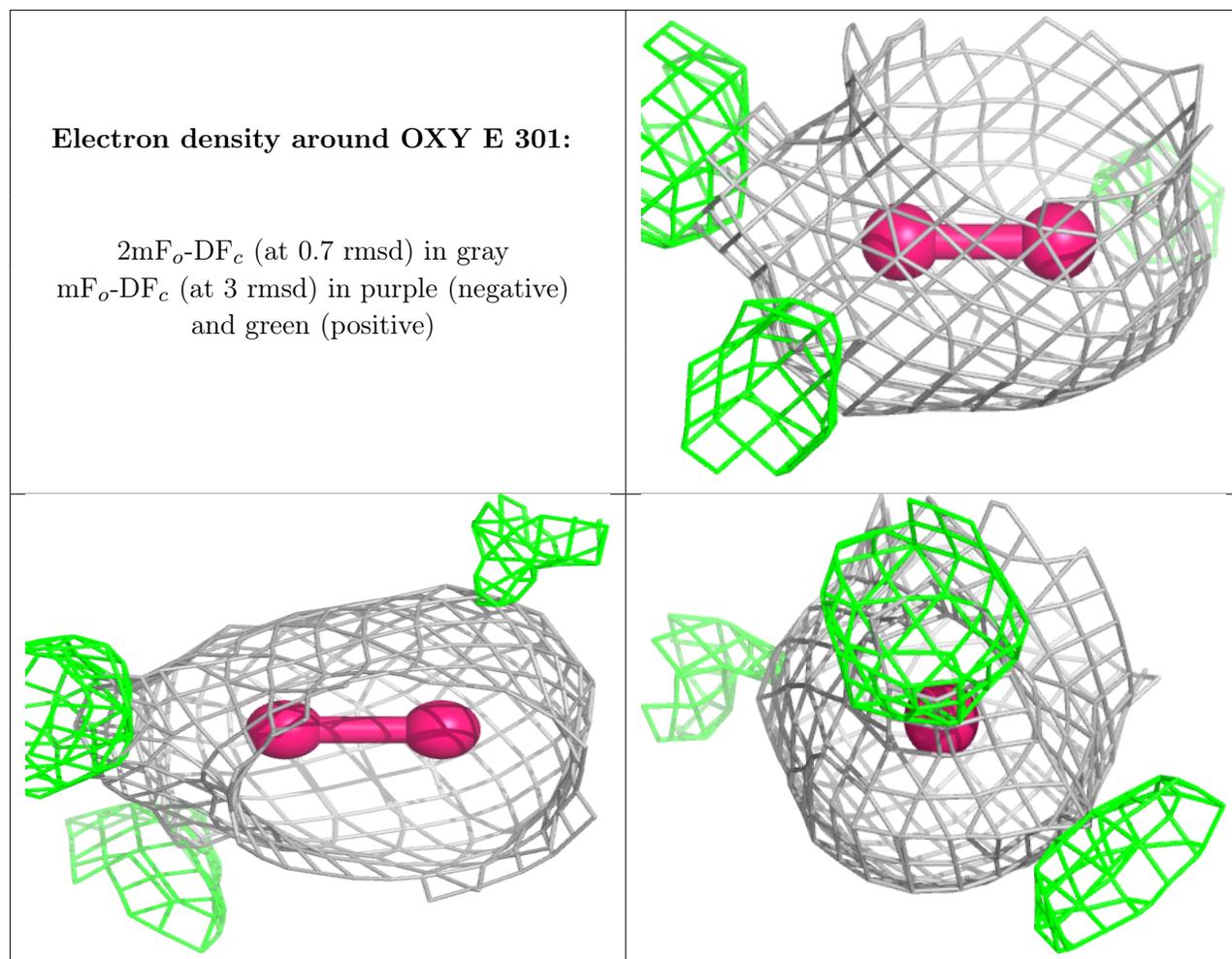
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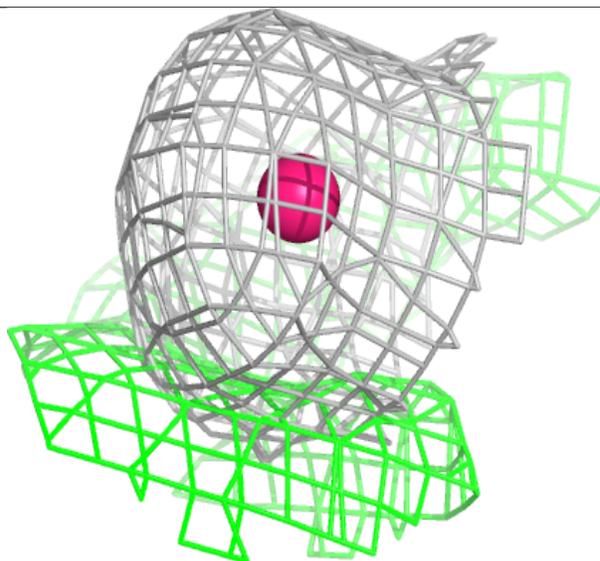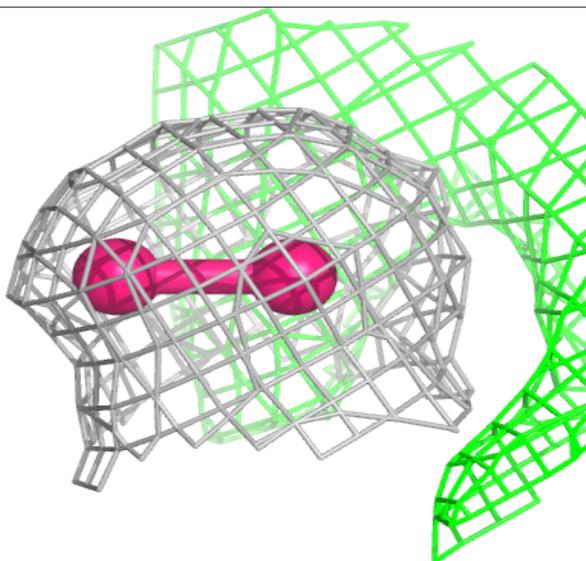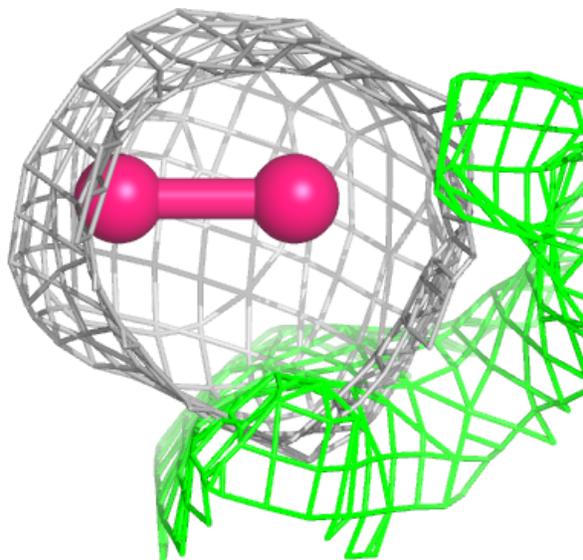
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and green (positive)

Electron density around OXY F 301:

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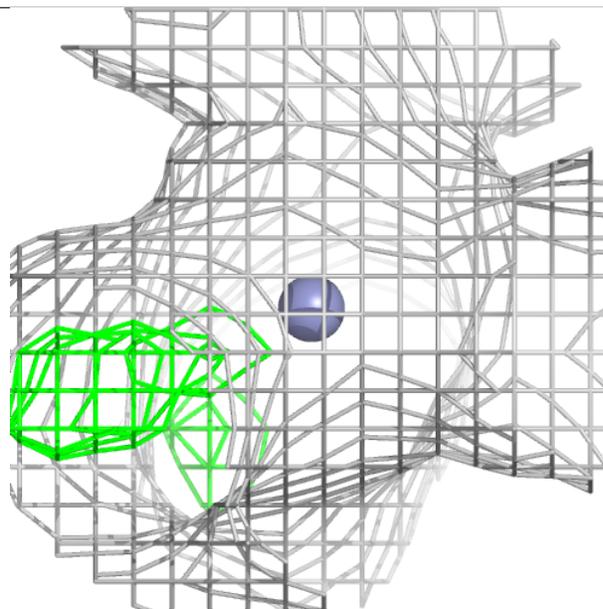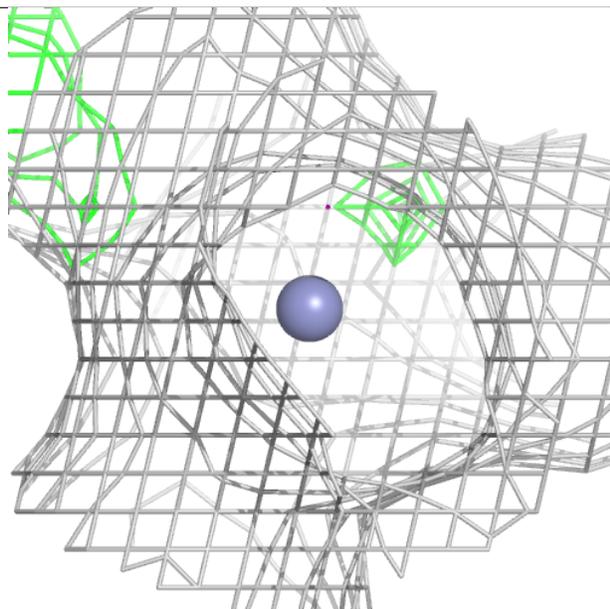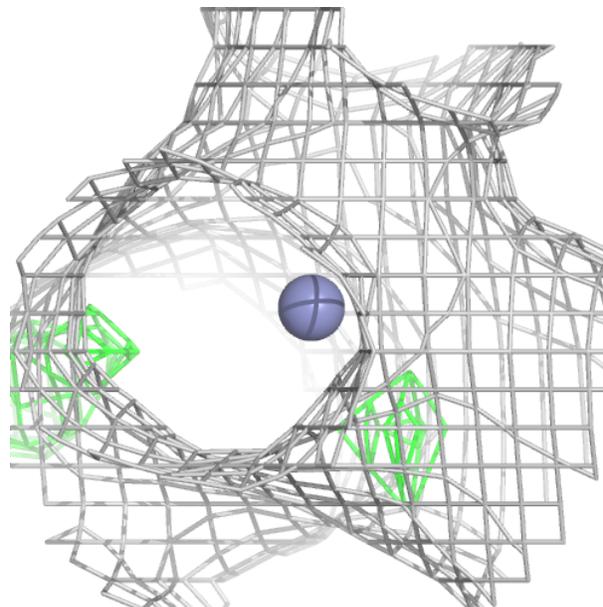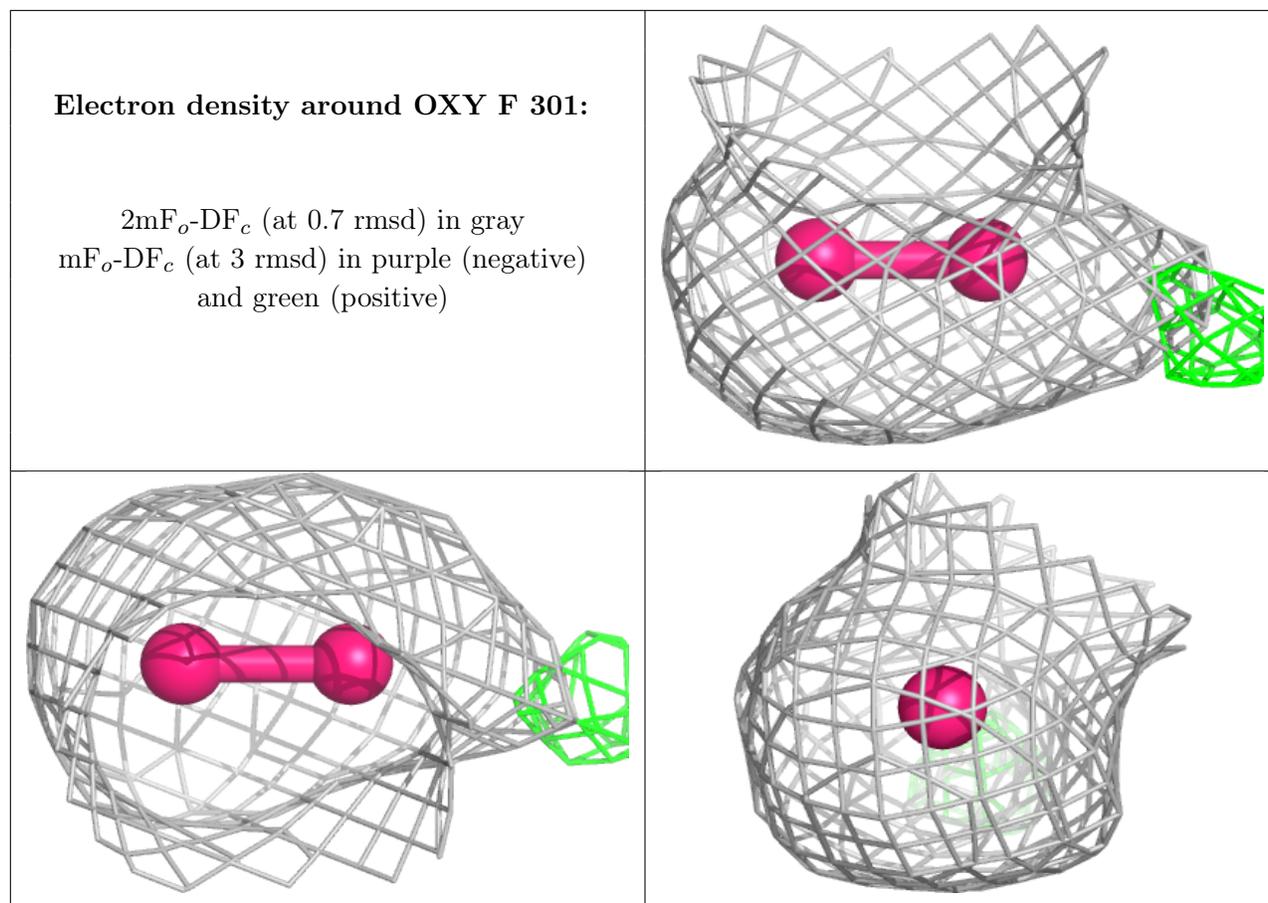
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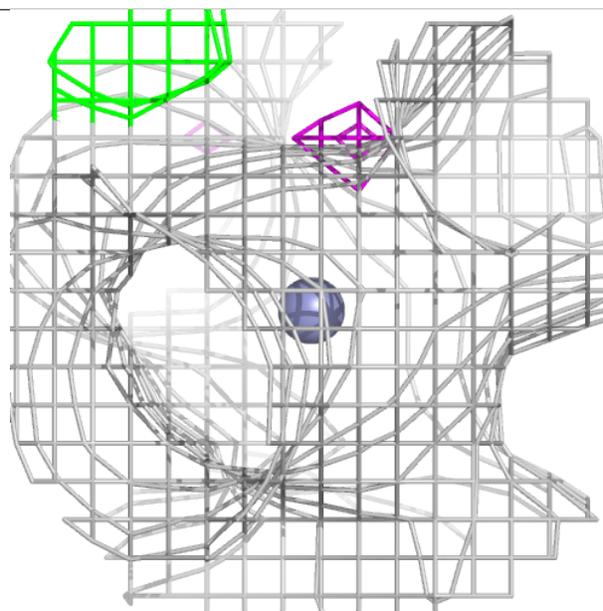$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
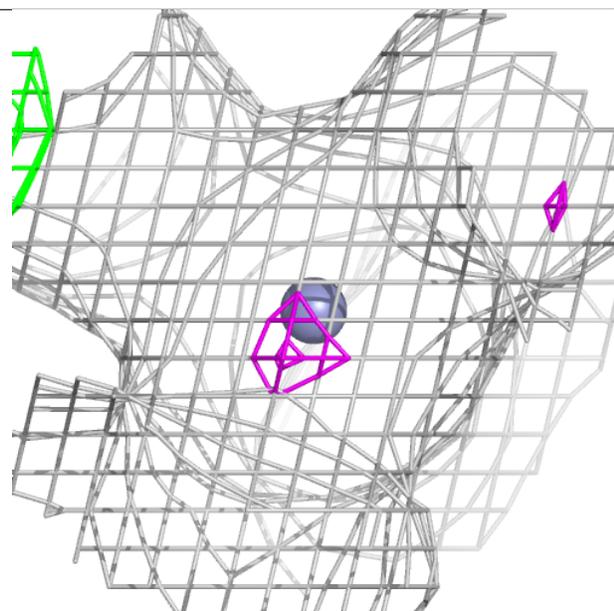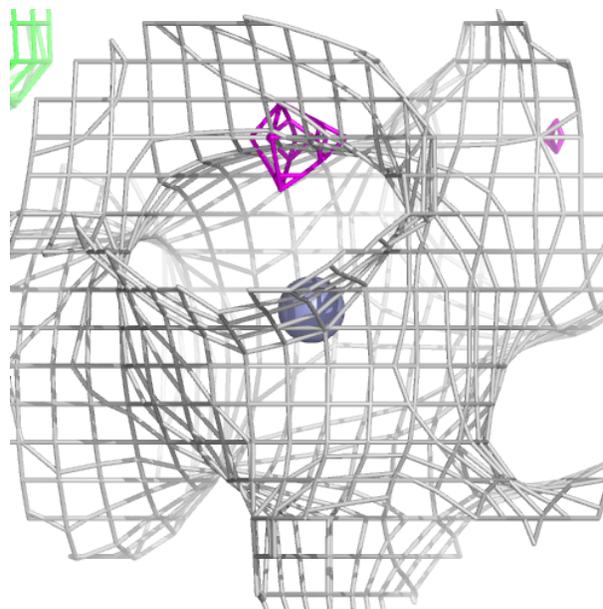and green (positive)
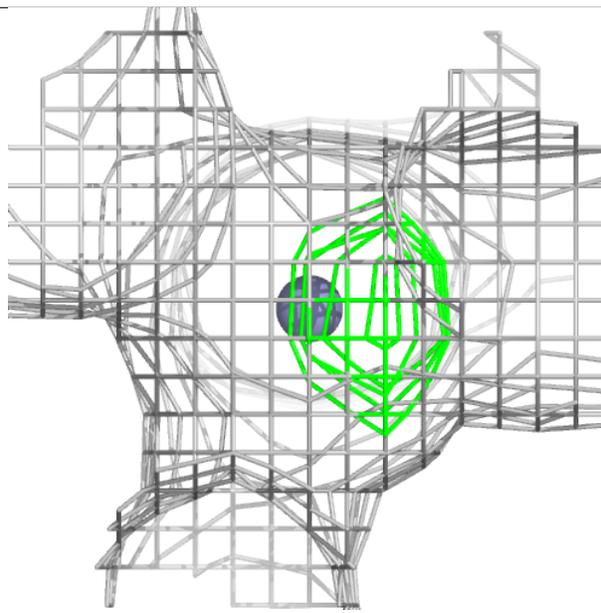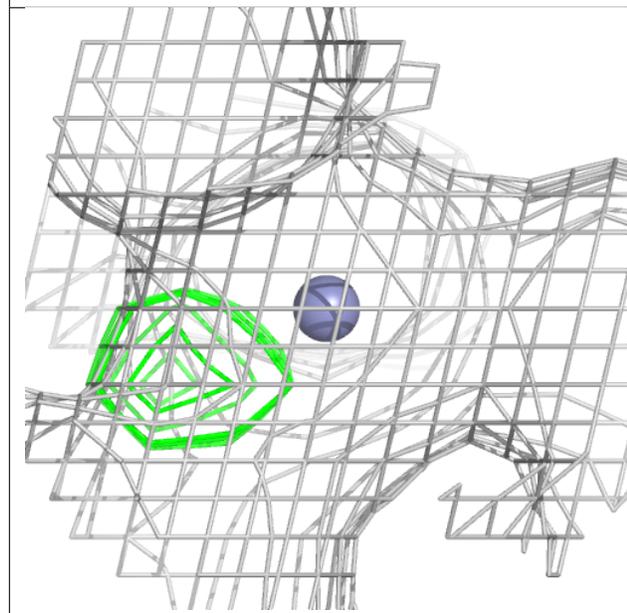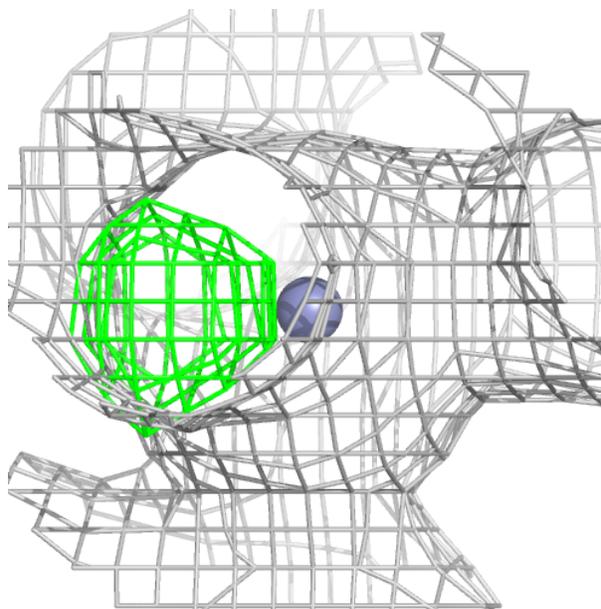
Electron density around ZN F 303:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
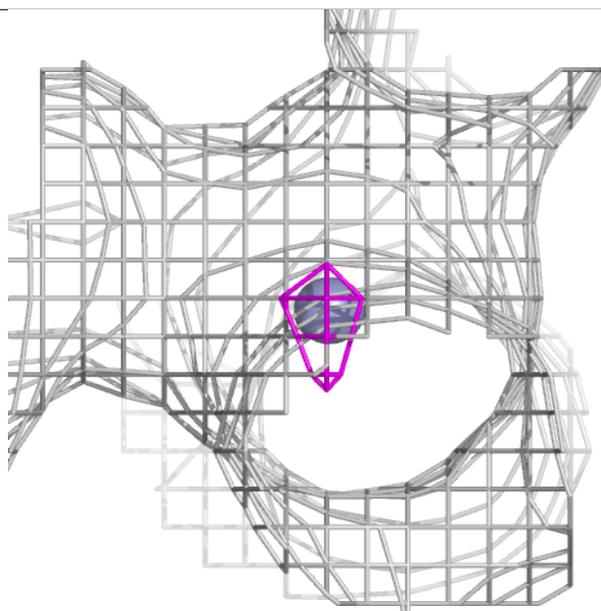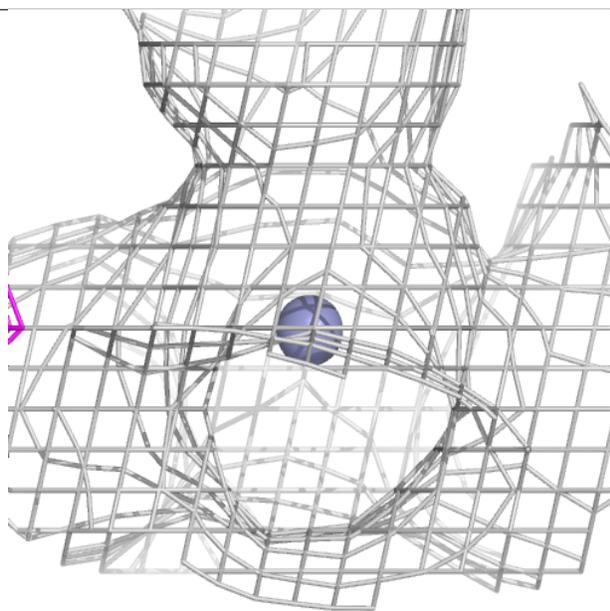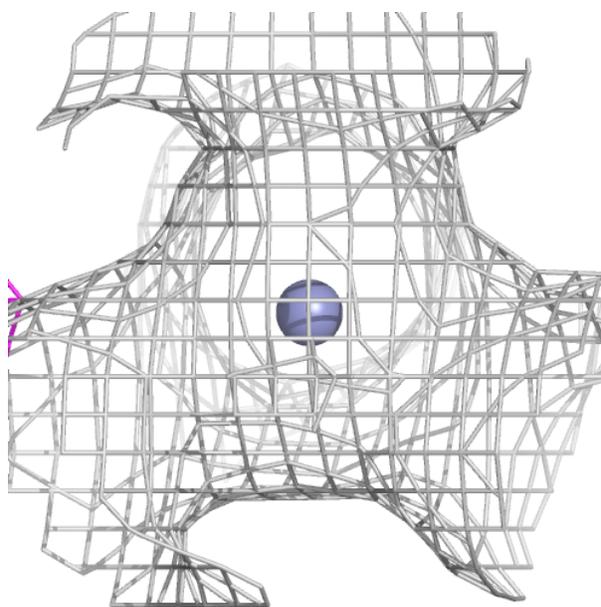
Electron density around ZN D 303:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
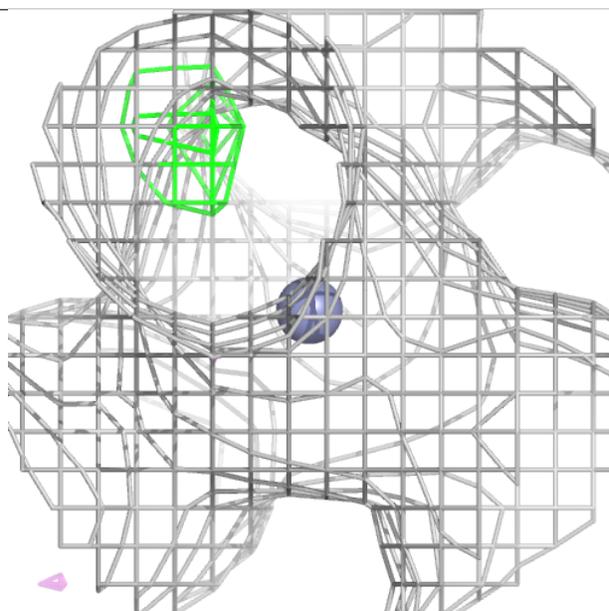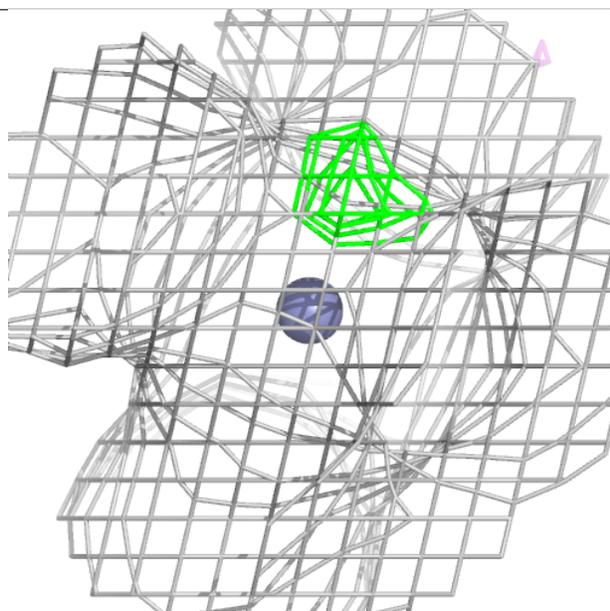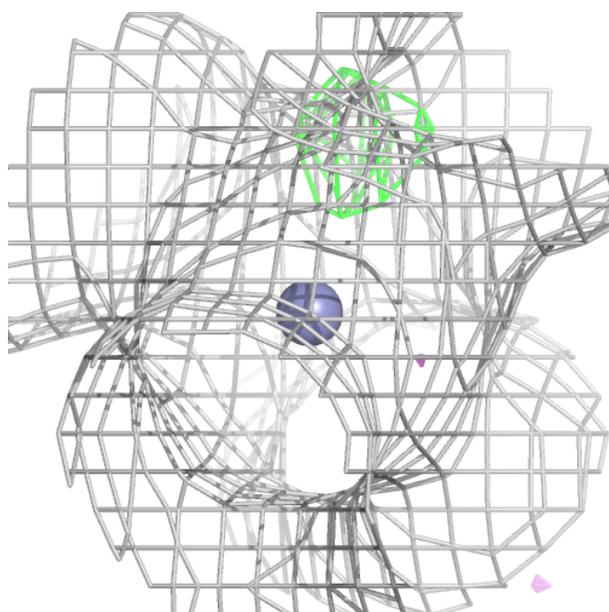
Electron density around ZN B 302:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
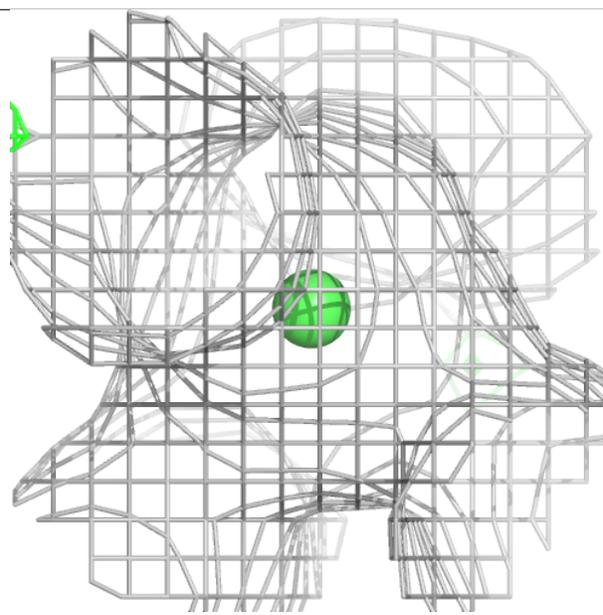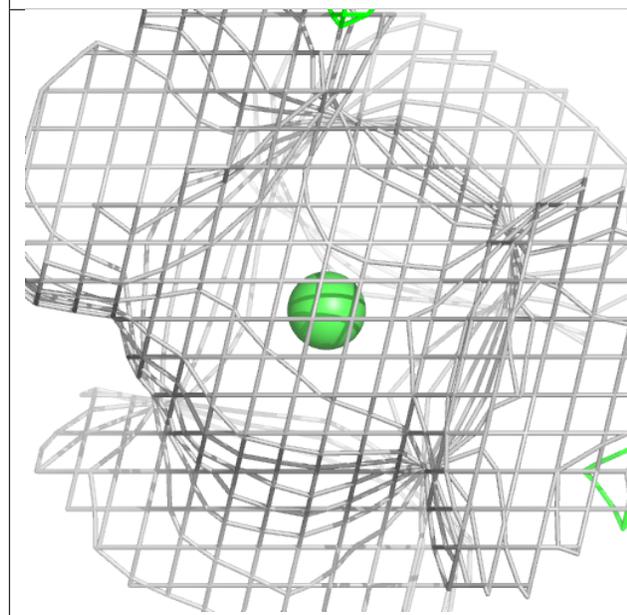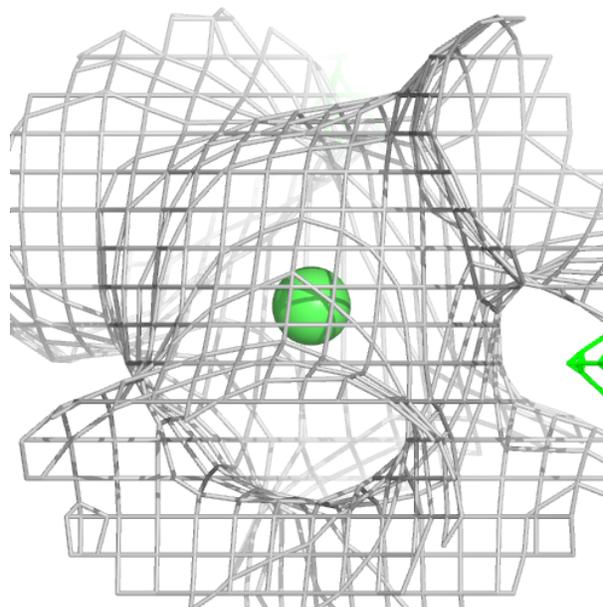mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
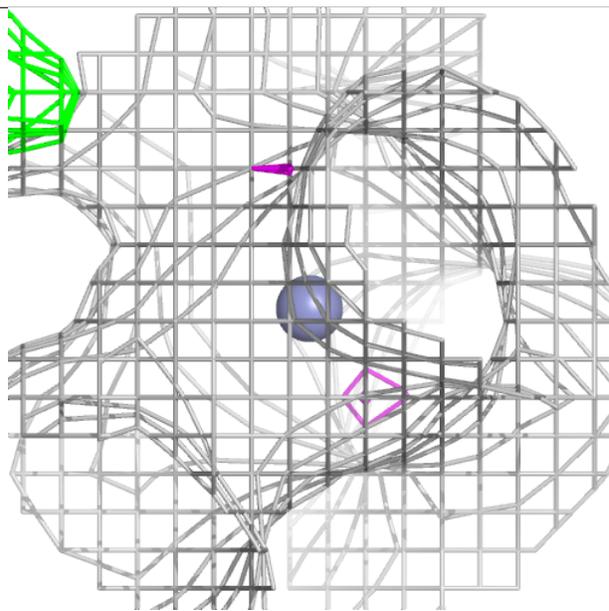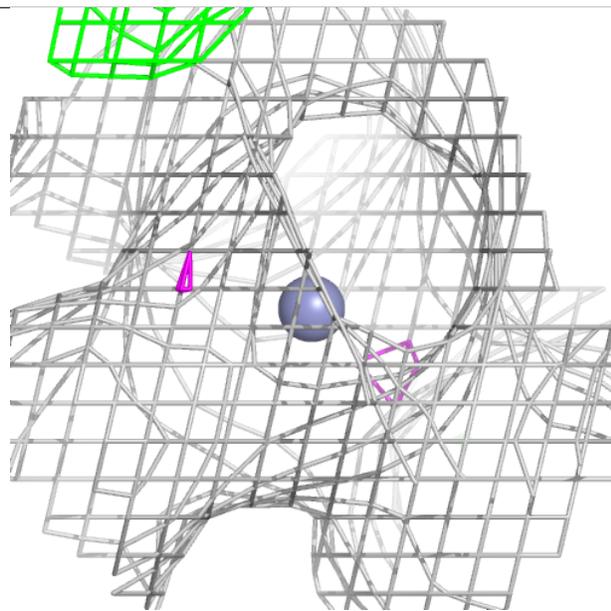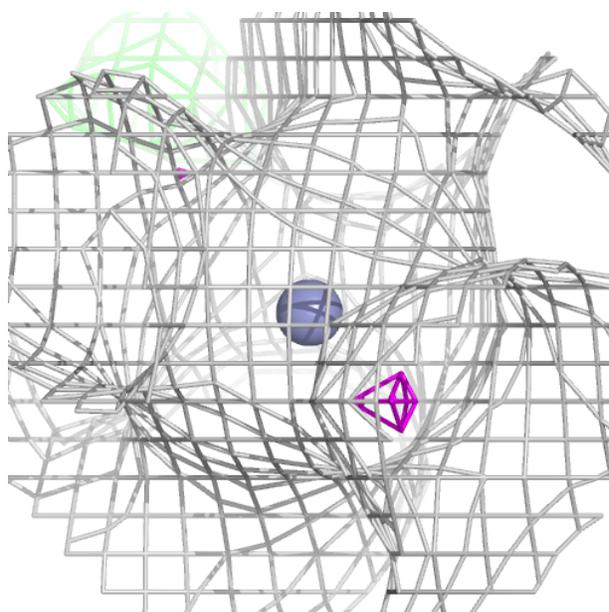
Electron density around ZN B 303:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
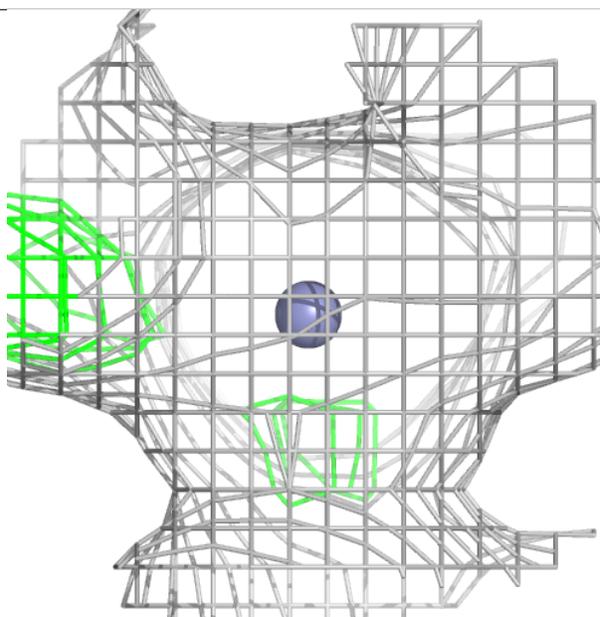
Electron density around ZN C 303:

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

Electron density around ZN E 302:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
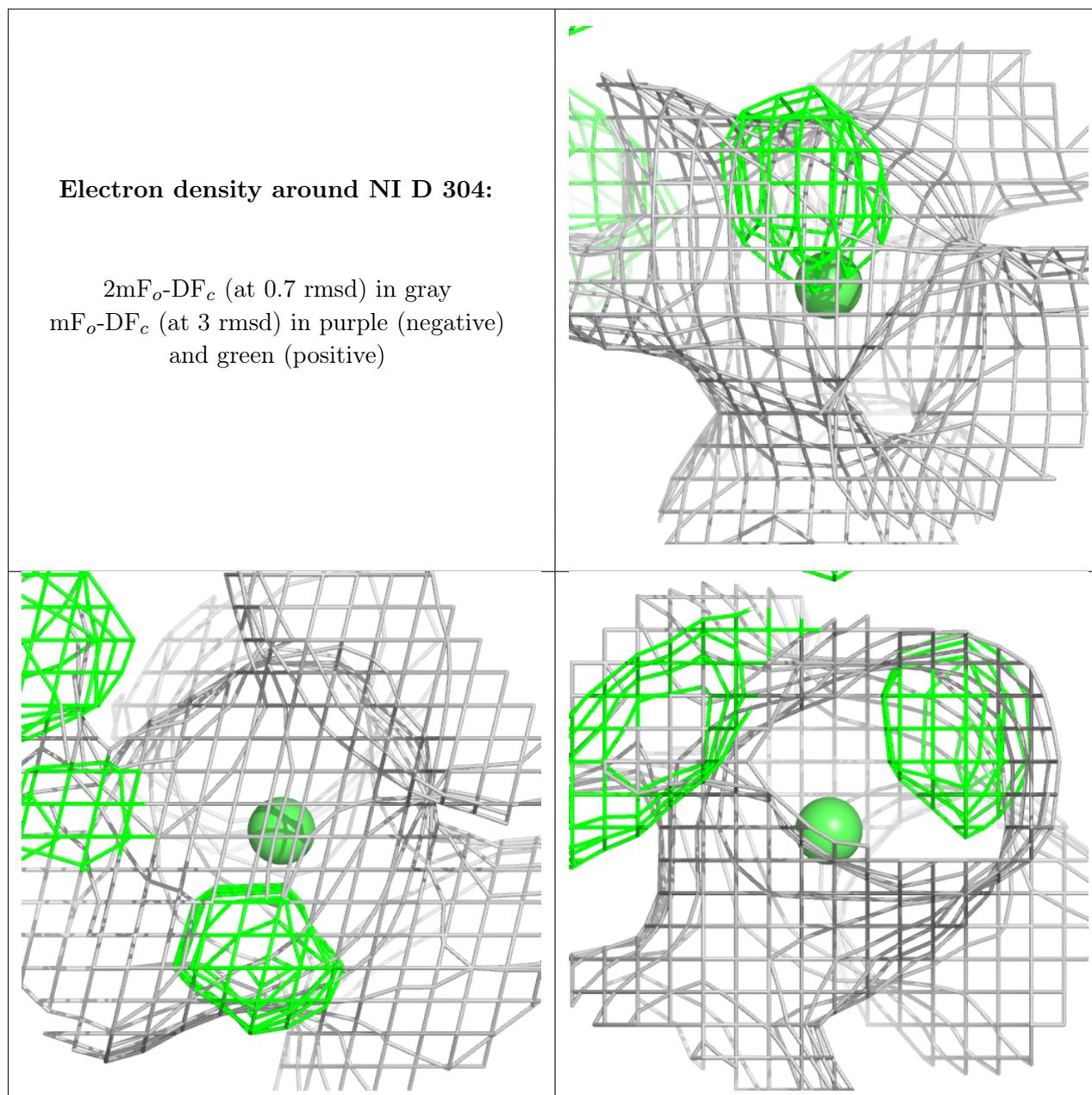
Electron density around ZN A 302:

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

Electron density around NI A 304:

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

Electron density around NI E 304:

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

Electron density around ZN A 303:

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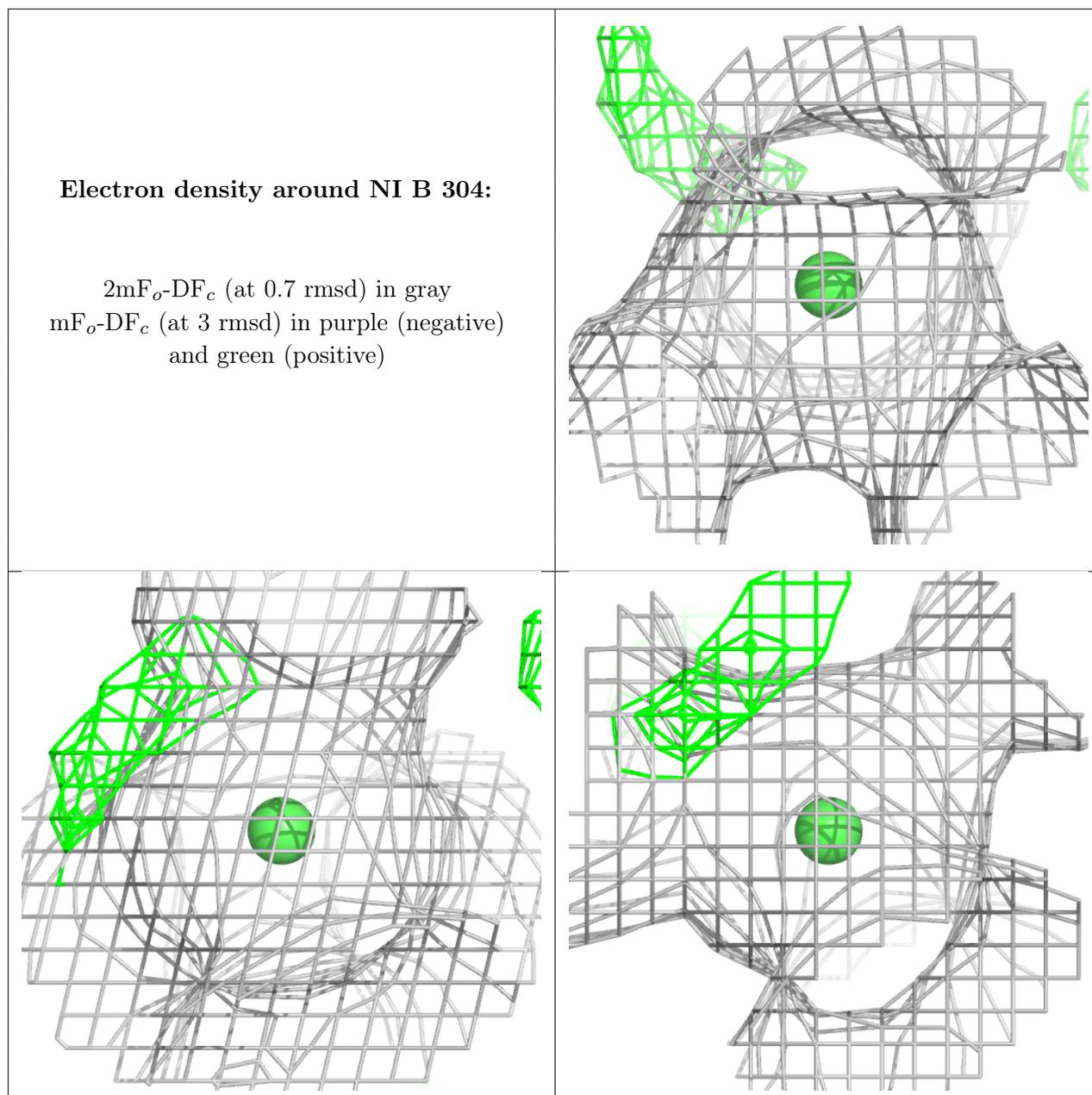$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around NI F 304:

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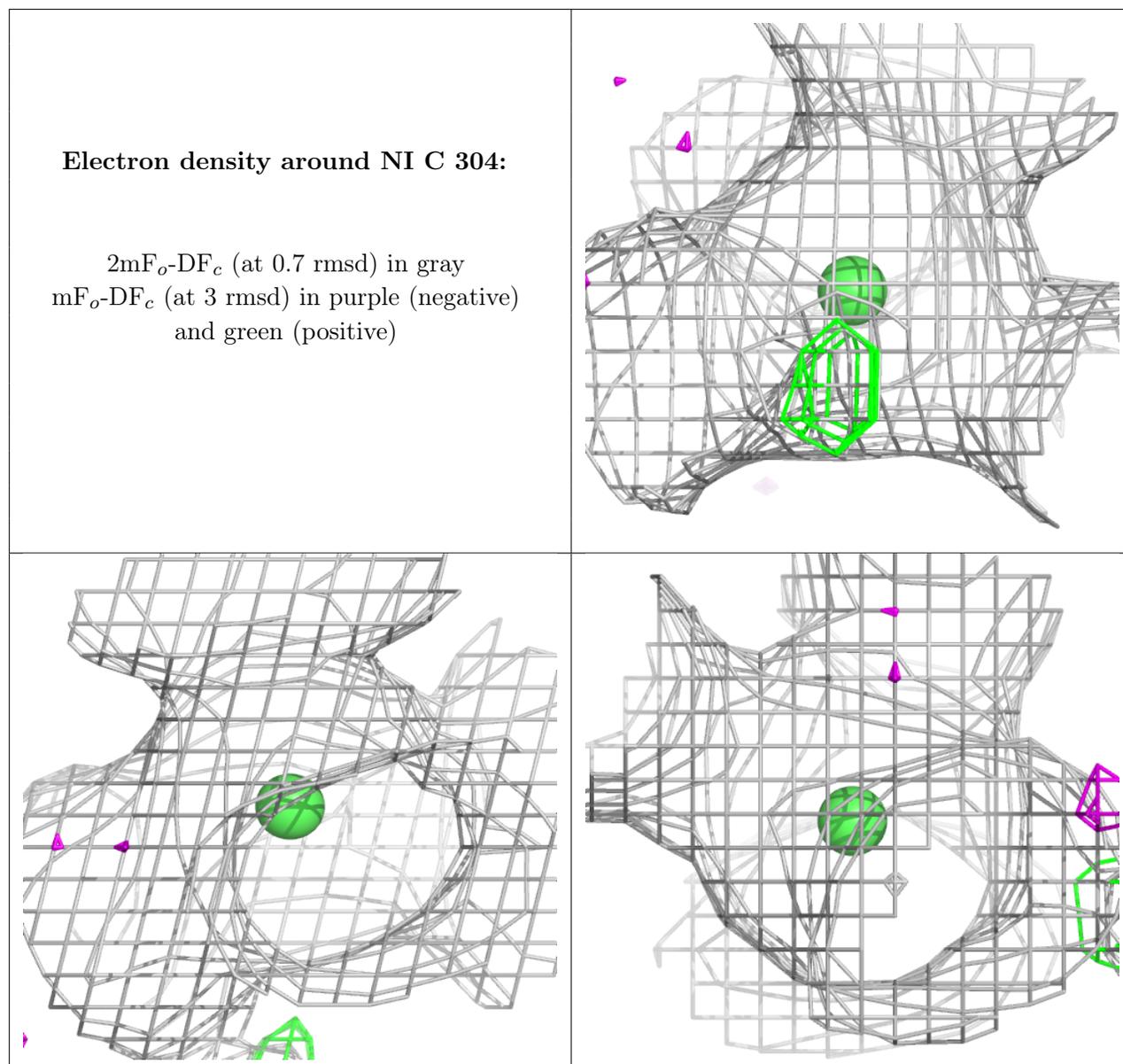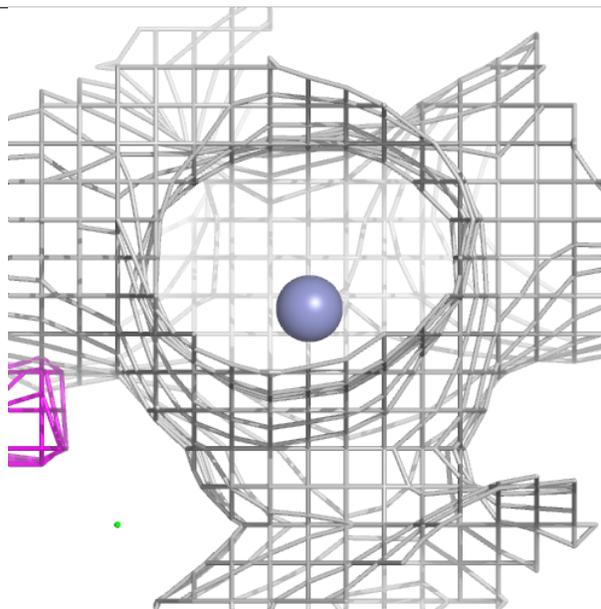$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around NI D 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 NI B 304:

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

Electron density around NI C 304:

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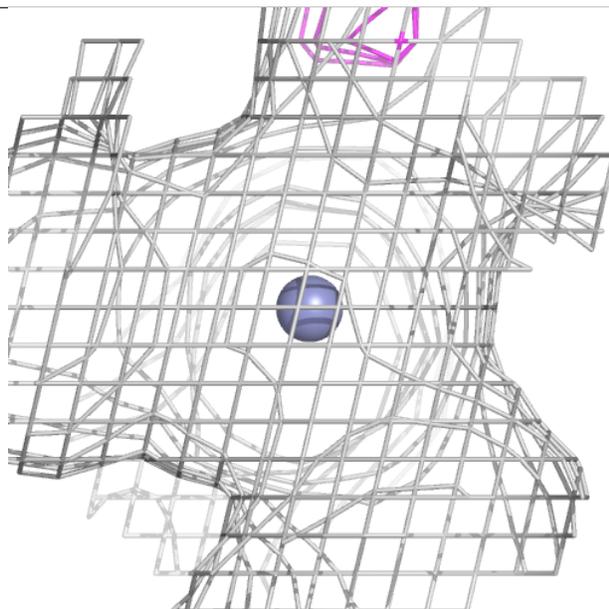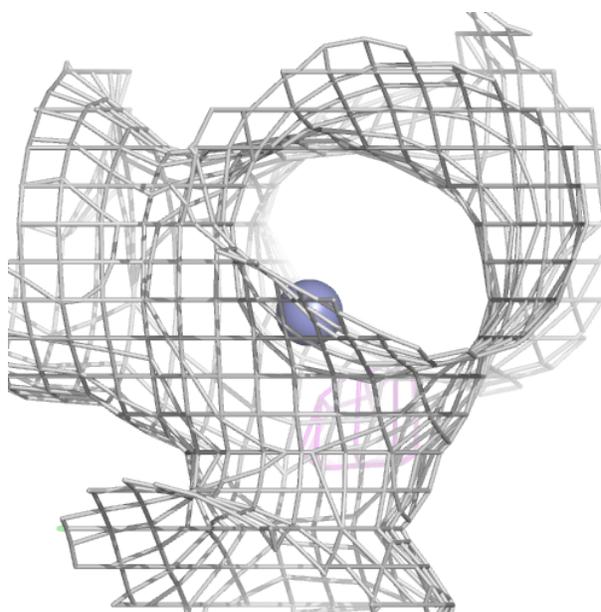mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around ZN D 302:

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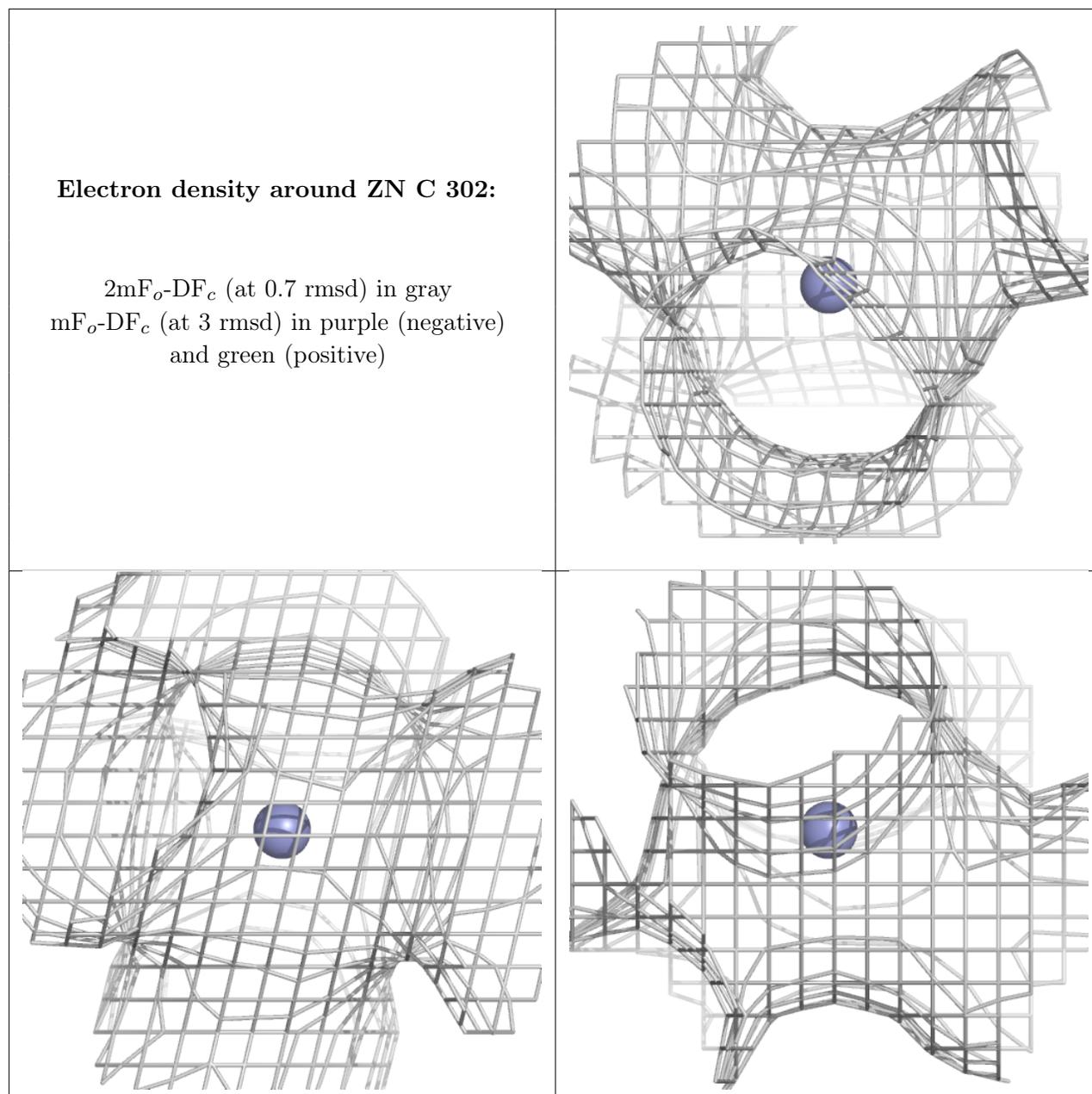and green (positive)

Electron density around ZN C 302:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.