Full wwPDB X-ray Structure Validation Report ⓘ

Apr 25, 2026 – 05:57 PM EDT

PDB ID	:	6UTU / pdb_00006utu
Title	:	Crystal structure of minor pseudopilin ternary complex of XcpVWX from the Type 2 secretion system of Pseudomonas aeruginosa in the P3 space group
Authors	:	Zhang, Y.; Wang, S.; Jia, Z.
Deposited on	:	2019-10-30
Resolution	:	2.85 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/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.

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

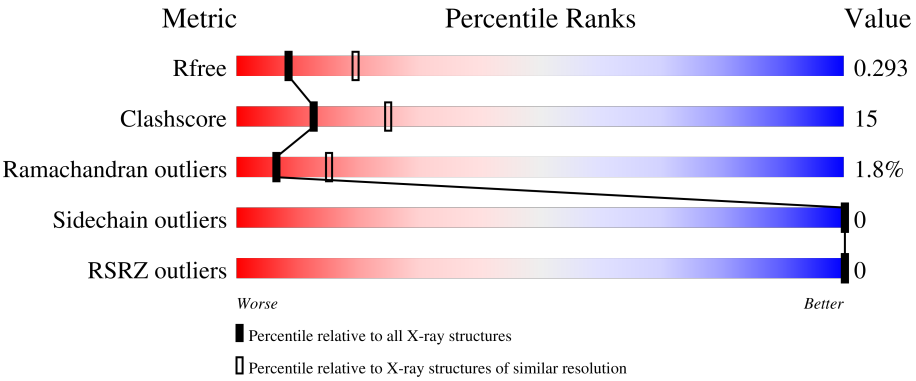
MolProbity	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.85 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	1407 (2.88-2.84)
Clashscore	190562	1446 (2.88-2.84)
Ramachandran outliers	187476	1406 (2.88-2.84)
Sidechain outliers	187428	1407 (2.88-2.84)
RSRZ outliers	180081	1408 (2.88-2.84)

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	92	47% 22% 32%
1	D	92	51% 27% 22%
1	G	92	37% 26% 37%
2	B	194	58% 25% • 16%
2	E	194	57% 26% 17%

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Mol	Chain	Length	Quality of chain
2	H	194	54% 28% 18%
3	C	273	70% 25%
3	F	273	63% 24% 13%
3	I	273	63% 27% 10%

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 10560 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 Type II secretion system protein I.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	63	Total	C	N	O	S	0	0	0
			444	286	79	78	1			
1	D	72	Total	C	N	O	S	0	0	0
			515	327	97	90	1			
1	G	58	Total	C	N	O	S	0	0	0
			418	267	76	74	1			

- Molecule 2 is a protein called Type II secretion system protein J.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	162	Total	C	N	O	S	0	0	0
			1275	798	245	229	3			
2	E	161	Total	C	N	O	S	0	0	0
			1250	785	240	222	3			
2	H	159	Total	C	N	O	S	0	0	0
			1244	778	241	223	2			

- Molecule 3 is a protein called Type II secretion system protein K.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	261	Total	C	N	O	S	0	0	0
			1871	1172	340	355	4			
3	F	238	Total	C	N	O	S	0	0	0
			1752	1102	317	329	4			
3	I	247	Total	C	N	O	S	0	0	0
			1780	1119	323	334	4			

- Molecule 4 is CALCIUM ION (CCD ID: CA) (formula: Ca) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	C	3	Total Ca 3 3	0	0
4	F	3	Total Ca 3 3	0	0
4	I	3	Total Ca 3 3	0	0

- Molecule 5 is water.

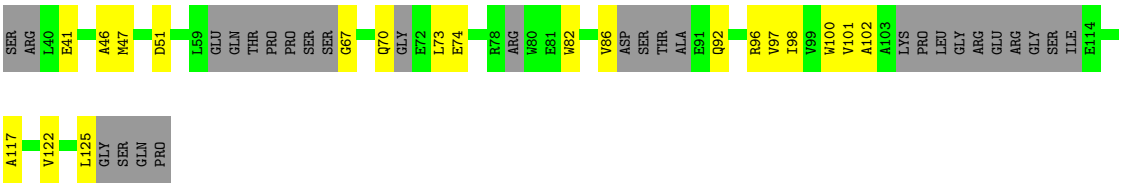
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	2	Total O 2 2	0	0

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.

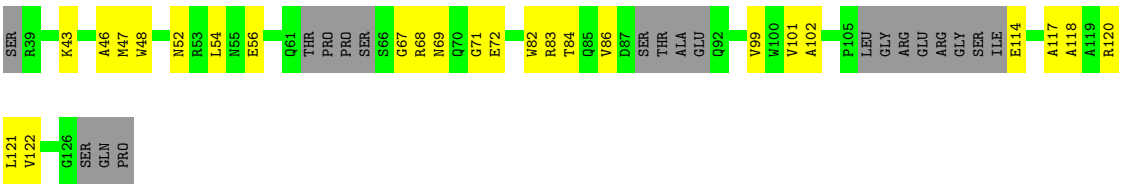
• Molecule 1: Type II secretion system protein I

Chain A:



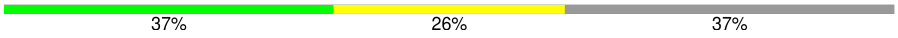
• Molecule 1: Type II secretion system protein I

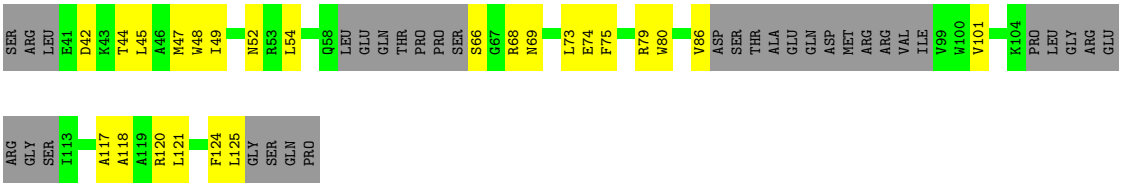
Chain D:



• Molecule 1: Type II secretion system protein I

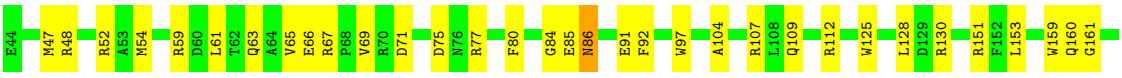
Chain G:

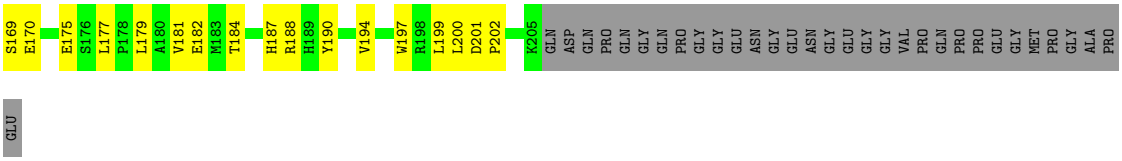




• Molecule 2: Type II secretion system protein J

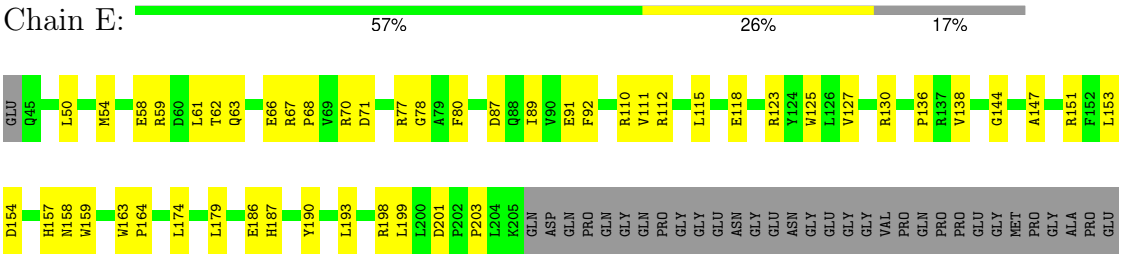
Chain B:





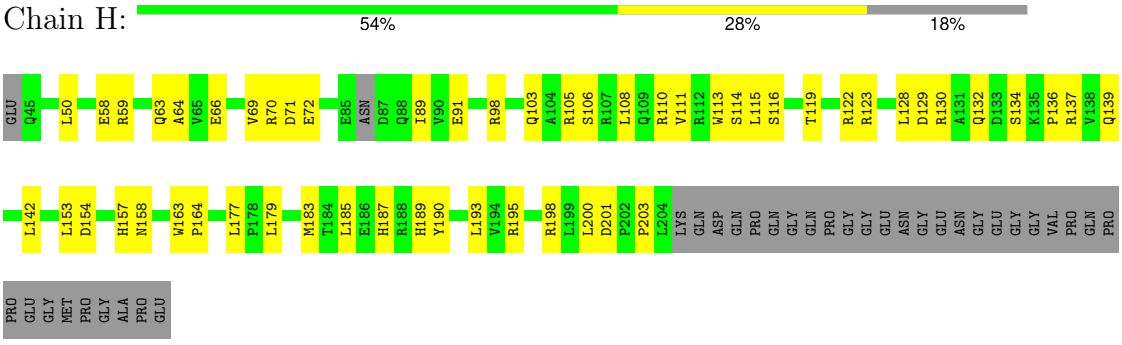
• Molecule 2: Type II secretion system protein J

Chain E:



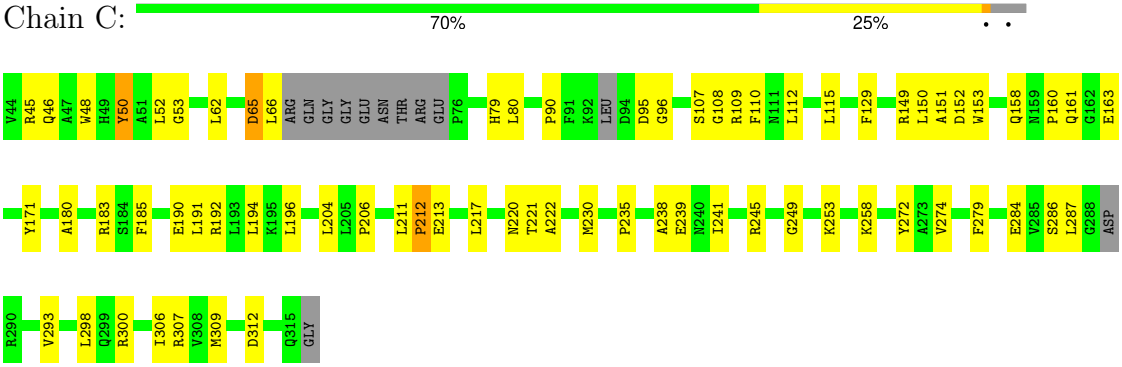
• Molecule 2: Type II secretion system protein J

Chain H:



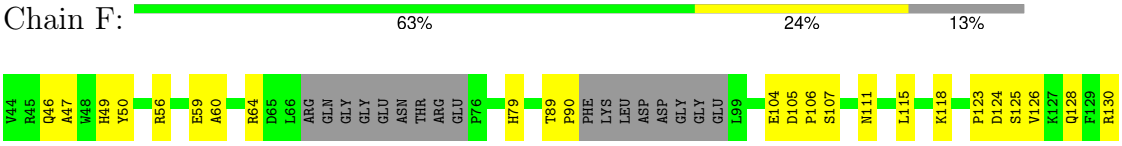
• Molecule 3: Type II secretion system protein K

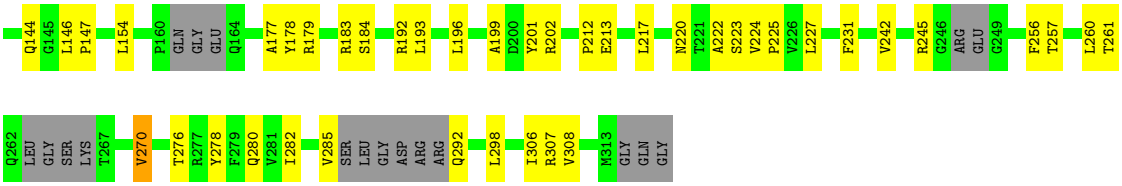
Chain C:



• Molecule 3: Type II secretion system protein K

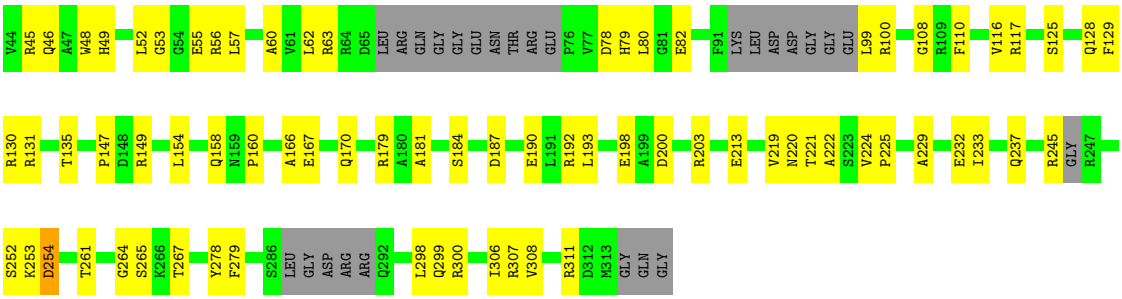
Chain F:





• Molecule 3: Type II secretion system protein K

Chain I:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 3	Depositor
Cell constants a, b, c, α, β, γ	158.10Å 158.10Å 64.70Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	19.91 – 2.85 19.91 – 2.85	Depositor EDS
% Data completeness (in resolution range)	100.0 (19.91-2.85) 100.0 (19.91-2.85)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.08 (at 2.83Å)	Xtriage
Refinement program	PHENIX 1.17.1_3660	Depositor
R, R_{free}	0.214 , 0.294 0.215 , 0.293	Depositor DCC
R_{free} test set	2108 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å^2)	79.0	Xtriage
Anisotropy	0.016	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.28 , 46.1	EDS
L-test for twinning[2]	$< \|L\| > = 0.41$, $< L^2 > = 0.23$	Xtriage
Estimated twinning fraction	0.068 for -h,-k,l 0.198 for h,-h-k,-l 0.073 for -k,-h,-l	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	10560	wwPDB-VP
Average B, all atoms (Å^2)	73.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.49% of the height of the origin peak. No significant pseudotranslation is detected.*

[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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: CA

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	0.39	0/446	0.59	0/605
1	D	0.40	0/520	0.61	0/705
1	G	0.38	0/424	0.59	0/576
2	B	0.46	0/1303	0.64	0/1770
2	E	0.42	0/1278	0.67	0/1738
2	H	0.46	0/1270	0.66	0/1723
3	C	0.46	1/1901 (0.1%)	0.68	0/2590
3	F	0.41	0/1781	0.62	0/2425
3	I	0.43	0/1808	0.63	0/2466
All	All	0.43	1/10731 (0.0%)	0.64	0/14598

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	65	ASP	CA-C	5.12	1.59	1.52

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	444	0	371	16	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	D	515	0	448	23	0
1	G	418	0	359	22	0
2	B	1275	0	1210	35	0
2	E	1250	0	1175	39	0
2	H	1244	0	1168	44	0
3	C	1871	0	1714	49	0
3	F	1752	0	1618	60	0
3	I	1780	0	1636	61	0
4	C	3	0	0	0	0
4	F	3	0	0	0	0
4	I	3	0	0	0	0
5	A	2	0	0	0	0
All	All	10560	0	9699	308	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 15.

All (308) 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)
2:E:67:ARG:CD	3:F:183:ARG:HH12	1.82	0.93
3:F:59:GLU:HG2	3:F:306:ILE:HD12	1.51	0.92
2:E:123:ARG:HD3	2:E:138:VAL:HG12	1.54	0.86
3:F:276:THR:HG22	3:F:278:TYR:H	1.42	0.85
1:A:102:ALA:HB2	1:A:117:ALA:HA	1.60	0.81
3:C:79:HIS:HB3	3:C:220:ASN:HD22	1.45	0.80
2:E:67:ARG:HD2	3:F:183:ARG:NH1	1.97	0.80
1:A:41:GLU:HB2	2:B:47:MET:HE2	1.64	0.79
3:C:284:GLU:HG3	3:C:293:VAL:HG22	1.66	0.78
3:I:130:ARG:HD3	3:I:147:PRO:HG2	1.67	0.75
2:E:67:ARG:HD2	3:F:183:ARG:HH12	1.49	0.73
3:F:123:PRO:HA	3:F:126:VAL:HG12	1.71	0.72
2:E:70:ARG:HH21	3:F:179:ARG:HD3	1.54	0.72
1:G:121:LEU:HA	3:I:46:GLN:HE22	1.55	0.71
2:B:179:LEU:HD11	2:B:202:PRO:HG3	1.73	0.71
3:F:130:ARG:HD3	3:F:147:PRO:HG2	1.73	0.70
2:H:89:ILE:HG23	2:H:114:SER:HB3	1.73	0.70
3:I:78:ASP:HA	3:I:82:GLU:OE2	1.92	0.69
3:C:112:LEU:HD11	3:C:191:LEU:HD22	1.75	0.68
2:E:154:ASP:OD1	2:E:158:ASN:N	2.23	0.67
2:E:59:ARG:O	2:E:63:GLN:HG3	1.95	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:59:GLU:HA	3:F:306:ILE:CD1	2.26	0.66
2:H:50:LEU:HD12	2:H:142:LEU:HD21	1.76	0.66
3:I:219:VAL:O	3:I:245:ARG:NH1	2.29	0.66
3:I:99:LEU:C	3:I:99:LEU:HD23	2.21	0.65
3:C:66:LEU:HD11	3:C:300:ARG:HD2	1.79	0.65
1:D:102:ALA:HB2	1:D:117:ALA:HA	1.78	0.65
2:H:59:ARG:O	2:H:63:GLN:HG3	1.97	0.64
3:F:146:LEU:HD13	3:F:196:LEU:HD12	1.80	0.64
2:H:153:LEU:HD11	2:H:157:HIS:HA	1.80	0.63
3:I:99:LEU:HD23	3:I:99:LEU:O	1.97	0.63
1:A:82:TRP:HA	1:A:100:TRP:O	1.98	0.63
3:I:131:ARG:O	3:I:135:THR:HG23	1.98	0.63
2:B:71:ASP:HB3	2:B:77:ARG:HD2	1.81	0.63
1:A:47:MET:SD	3:C:45:ARG:NH2	2.69	0.62
3:C:253:LYS:HE3	3:C:272:TYR:CZ	2.35	0.62
3:F:59:GLU:CG	3:F:306:ILE:HD12	2.27	0.62
2:E:68:PRO:HD2	3:F:183:ARG:CZ	2.30	0.62
3:I:62:LEU:HD11	3:I:279:PHE:CG	2.35	0.62
1:G:48:TRP:HE1	3:I:45:ARG:HH12	1.48	0.61
3:I:252:SER:O	3:I:254:ASP:N	2.33	0.61
2:E:153:LEU:HD13	2:E:159:TRP:CE2	2.36	0.60
3:F:59:GLU:HA	3:F:306:ILE:HD12	1.82	0.60
3:C:171:TYR:OH	3:C:194:LEU:HD22	2.01	0.60
1:G:73:LEU:O	1:G:80:TRP:N	2.31	0.60
2:H:72:GLU:O	3:I:179:ARG:NH2	2.34	0.60
2:B:184:THR:HG23	2:B:194:VAL:HG22	1.84	0.59
2:H:183:MET:SD	2:H:185:LEU:HD23	2.42	0.59
2:E:203:PRO:HA	3:F:307:ARG:HD2	1.84	0.59
3:I:79:HIS:HA	3:I:220:ASN:HB3	1.84	0.59
2:E:58:GLU:O	2:E:62:THR:OG1	2.17	0.59
3:I:192:ARG:HH21	3:I:198:GLU:HB2	1.65	0.59
3:F:79:HIS:HB3	3:F:220:ASN:ND2	2.17	0.59
1:A:82:TRP:HB3	1:A:101:VAL:HG12	1.84	0.59
2:B:80:PHE:HB2	2:B:177:LEU:HD22	1.85	0.58
3:I:62:LEU:CD2	3:I:300:ARG:HD3	2.34	0.58
3:F:60:ALA:HB1	3:F:64:ARG:HH21	1.68	0.58
2:E:151:ARG:HD2	2:E:159:TRP:HB3	1.86	0.58
3:I:116:VAL:HG21	3:I:154:LEU:HB3	1.85	0.57
1:A:67:GLY:O	1:A:86:VAL:HG22	2.04	0.57
3:F:47:ALA:HA	3:F:50:TYR:HB2	1.85	0.57
3:F:242:VAL:HG13	3:F:245:ARG:NH2	2.20	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:44:THR:O	1:G:47:MET:HB2	2.05	0.57
1:A:51:ASP:OD2	3:C:45:ARG:NE	2.38	0.57
2:B:153:LEU:HD13	2:B:159:TRP:CE2	2.39	0.57
3:F:115:LEU:HA	3:F:125:SER:HB2	1.86	0.57
1:D:68:ARG:O	1:D:69:ASN:ND2	2.36	0.57
2:H:72:GLU:HB3	2:H:132:GLN:HA	1.85	0.57
3:I:158:GLN:O	3:I:160:PRO:HD3	2.05	0.56
2:B:151:ARG:HE	2:B:159:TRP:CB	2.18	0.56
3:C:149:ARG:NH1	3:C:194:LEU:O	2.39	0.56
1:G:48:TRP:O	1:G:52:ASN:N	2.34	0.56
2:H:154:ASP:O	2:H:179:LEU:HD22	2.06	0.56
3:I:166:ALA:HA	3:I:170:GLN:HE21	1.69	0.56
3:F:196:LEU:HD22	3:F:201:TYR:HB2	1.88	0.56
1:D:83:ARG:NH1	1:D:114:GLU:OE2	2.39	0.56
2:B:91:GLU:OE2	2:B:112:ARG:HD2	2.06	0.55
3:C:235:PRO:O	3:C:239:GLU:HB2	2.06	0.55
1:D:122:VAL:HG12	3:F:46:GLN:CD	2.30	0.55
2:B:61:LEU:HD12	2:B:197:TRP:CE3	2.42	0.55
2:E:67:ARG:HD3	3:F:183:ARG:HH12	1.70	0.55
1:G:121:LEU:HA	3:I:46:GLN:NE2	2.20	0.55
1:G:49:ILE:HA	1:G:52:ASN:HB2	1.88	0.54
2:H:122:ARG:O	2:H:139:GLN:HG2	2.07	0.54
1:A:96:ARG:HG2	1:A:97:VAL:N	2.20	0.54
3:I:62:LEU:HD11	3:I:279:PHE:CD1	2.42	0.54
2:B:69:VAL:HB	2:B:128:LEU:O	2.07	0.54
3:F:227:LEU:HD12	3:F:231:PHE:HE2	1.73	0.54
2:E:198:ARG:O	2:E:199:LEU:HD23	2.08	0.54
3:F:282:ILE:HD12	3:F:282:ILE:H	1.73	0.54
2:E:187:HIS:HB3	2:E:190:TYR:HB2	1.90	0.54
2:H:183:MET:CE	2:H:185:LEU:HD23	2.37	0.54
1:A:98:ILE:HG23	1:A:122:VAL:HG12	1.88	0.54
2:B:200:LEU:HD13	3:C:309:MET:O	2.09	0.53
2:E:54:MET:HE1	2:E:193:LEU:HD13	1.89	0.53
2:B:84:GLY:O	2:B:86:ASN:N	2.42	0.53
1:D:122:VAL:N	3:F:46:GLN:OE1	2.37	0.53
2:E:80:PHE:CD2	2:E:92:PHE:HB3	2.44	0.53
3:C:115:LEU:HD22	3:C:150:LEU:HG	1.91	0.52
3:I:80:LEU:HG	3:I:221:THR:HG22	1.91	0.52
3:C:110:PHE:CZ	3:C:129:PHE:HB2	2.44	0.52
3:C:158:GLN:O	3:C:160:PRO:HD3	2.10	0.52
2:B:151:ARG:HE	2:B:159:TRP:HB3	1.73	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:71:GLY:HA3	1:D:82:TRP:CE2	2.45	0.52
3:F:192:ARG:NH1	3:F:196:LEU:O	2.43	0.52
1:A:46:ALA:HB1	1:A:101:VAL:HG23	1.92	0.51
2:H:113:TRP:CE2	2:H:122:ARG:HG3	2.44	0.51
3:I:131:ARG:NH1	3:I:229:ALA:O	2.43	0.51
3:I:232:GLU:O	3:I:233:ILE:HD13	2.11	0.51
3:I:53:GLY:O	3:I:56:ARG:N	2.44	0.51
2:B:151:ARG:HA	2:B:160:GLN:O	2.11	0.51
3:F:285:VAL:HG22	3:F:292:GLN:O	2.10	0.51
1:G:124:PHE:O	3:I:56:ARG:NH1	2.44	0.51
3:I:62:LEU:HD23	3:I:62:LEU:O	2.11	0.51
3:I:261:THR:HA	3:I:265:SER:HA	1.93	0.50
3:F:298:LEU:HD13	3:F:306:ILE:HG21	1.92	0.50
3:C:183:ARG:HB3	3:C:183:ARG:NH1	2.26	0.50
2:H:201:ASP:O	3:I:307:ARG:NH1	2.44	0.50
3:C:191:LEU:HD21	3:C:204:LEU:HD23	1.93	0.50
3:F:56:ARG:O	3:F:59:GLU:HB2	2.12	0.50
1:D:67:GLY:HA2	1:D:86:VAL:H	1.77	0.50
3:I:166:ALA:HA	3:I:170:GLN:NE2	2.26	0.50
1:D:68:ARG:HH21	1:D:83:ARG:HH11	1.60	0.50
2:E:118:GLU:CD	2:E:144:GLY:HA2	2.36	0.50
3:F:257:THR:O	3:F:261:THR:HG23	2.12	0.49
2:H:129:ASP:OD2	3:I:181:ALA:HA	2.12	0.49
2:H:163:TRP:CD1	2:H:164:PRO:HA	2.48	0.49
2:E:115:LEU:H	2:E:115:LEU:CD2	2.25	0.49
3:I:233:ILE:CG2	3:I:237:GLN:HB2	2.43	0.49
3:C:245:ARG:O	3:C:249:GLY:N	2.46	0.49
2:E:50:LEU:HD13	2:E:190:TYR:CD2	2.48	0.49
1:A:97:VAL:HG21	1:A:125:LEU:HD13	1.94	0.49
1:D:43:LYS:HG2	1:D:118:ALA:O	2.12	0.49
3:F:298:LEU:HD22	3:F:308:VAL:HG22	1.95	0.49
1:A:70:GLN:HA	1:A:82:TRP:CZ3	2.48	0.48
1:A:122:VAL:O	3:C:46:GLN:NE2	2.46	0.48
1:G:49:ILE:HG23	1:G:101:VAL:HG11	1.95	0.48
2:E:66:GLU:OE1	3:F:307:ARG:NH1	2.46	0.48
3:I:160:PRO:HG3	3:I:167:GLU:HB2	1.95	0.48
3:C:211:LEU:O	3:C:212:PRO:C	2.57	0.48
3:F:104:GLU:N	3:F:280:GLN:O	2.43	0.48
2:B:187:HIS:ND1	2:B:190:TYR:HD1	2.11	0.48
3:C:107:SER:O	3:C:217:LEU:HD12	2.13	0.48
2:H:106:SER:HB3	3:I:190:GLU:HA	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:65:ASP:HB3	3:C:300:ARG:NH2	2.28	0.48
3:F:178:TYR:CE2	3:F:193:LEU:HD22	2.48	0.48
2:H:123:ARG:HB3	2:H:136:PRO:HB2	1.95	0.48
3:I:100:ARG:HG2	3:I:100:ARG:HH11	1.78	0.47
2:B:67:ARG:NH1	3:C:190:GLU:OE1	2.47	0.47
2:E:54:MET:O	2:E:58:GLU:HB2	2.13	0.47
3:F:276:THR:HG22	3:F:278:TYR:N	2.21	0.47
3:I:298:LEU:HD22	3:I:306:ILE:HG21	1.97	0.47
3:C:50:TYR:O	3:C:53:GLY:N	2.45	0.47
1:D:54:LEU:HD13	3:F:49:HIS:CD2	2.48	0.47
1:G:120:ARG:O	1:G:121:LEU:HD23	2.13	0.47
2:B:107:ARG:NH2	3:C:312:ASP:OD2	2.47	0.47
3:C:109:ARG:HD3	3:C:206:PRO:O	2.14	0.47
1:D:46:ALA:O	1:D:101:VAL:HG21	2.13	0.47
2:H:69:VAL:HB	2:H:128:LEU:O	2.14	0.47
3:F:223:SER:O	3:F:227:LEU:HB2	2.15	0.47
2:H:69:VAL:HG11	2:H:110:ARG:HD3	1.97	0.47
2:H:115:LEU:HD12	2:H:119:THR:O	2.15	0.47
3:I:48:TRP:O	3:I:52:LEU:HD12	2.14	0.47
3:C:48:TRP:O	3:C:52:LEU:HB2	2.14	0.47
3:F:222:ALA:HB3	3:F:227:LEU:HD13	1.96	0.47
2:B:97:TRP:CE3	2:B:109:GLN:HB2	2.49	0.47
2:E:71:ASP:HB3	2:E:77:ARG:HG3	1.96	0.47
2:H:103:GLN:O	2:H:105:ARG:N	2.46	0.47
3:C:298:LEU:HD13	3:C:306:ILE:HG21	1.97	0.47
2:E:163:TRP:CG	2:E:164:PRO:HA	2.50	0.47
3:F:217:LEU:HD11	3:F:222:ALA:HB2	1.97	0.47
3:I:192:ARG:NH2	3:I:198:GLU:HB2	2.30	0.47
3:F:199:ALA:O	3:F:202:ARG:HG3	2.14	0.47
3:F:224:VAL:HB	3:F:225:PRO:HD3	1.97	0.47
2:H:154:ASP:OD1	2:H:158:ASN:N	2.47	0.46
3:I:224:VAL:HG22	3:I:225:PRO:HD3	1.96	0.46
3:C:230:MET:HE3	3:C:230:MET:HB2	1.83	0.46
3:I:233:ILE:HG23	3:I:237:GLN:OE1	2.14	0.46
2:H:70:ARG:HH21	3:I:179:ARG:HD3	1.79	0.46
3:I:108:GLY:O	3:I:222:ALA:HA	2.15	0.46
3:I:233:ILE:HG23	3:I:237:GLN:CD	2.40	0.46
1:A:47:MET:SD	3:C:45:ARG:HD2	2.56	0.46
2:B:59:ARG:O	2:B:63:GLN:HG3	2.15	0.46
3:I:170:GLN:OE1	3:I:170:GLN:N	2.49	0.46
1:A:73:LEU:HD12	1:A:74:GLU:H	1.79	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:200:LEU:HD13	2:H:200:LEU:HA	1.75	0.46
3:I:116:VAL:CG2	3:I:154:LEU:HB3	2.45	0.46
3:I:60:ALA:O	3:I:63:ARG:N	2.46	0.46
2:B:61:LEU:HD13	2:B:181:VAL:CG2	2.46	0.46
1:G:66:SER:HA	1:G:86:VAL:HG11	1.98	0.46
2:B:188:ARG:HH21	2:H:123:ARG:HH21	1.61	0.46
2:E:111:VAL:HA	2:E:123:ARG:O	2.16	0.46
2:B:61:LEU:HD23	2:B:92:PHE:CZ	2.52	0.45
2:B:71:ASP:OD2	2:B:75:ASP:HB2	2.16	0.45
2:H:187:HIS:ND1	2:H:190:TYR:HD1	2.14	0.45
3:I:100:ARG:HG2	3:I:100:ARG:NH1	2.31	0.45
3:I:200:ASP:OD1	3:I:203:ARG:NH2	2.49	0.45
3:I:149:ARG:HG2	3:I:166:ALA:HB3	1.98	0.45
3:C:307:ARG:HG2	3:C:309:MET:HG2	1.98	0.45
3:I:110:PHE:CZ	3:I:129:PHE:HB2	2.50	0.45
3:F:107:SER:HB2	3:F:276:THR:HG23	1.98	0.45
2:E:89:ILE:HD13	2:E:112:ARG:NH2	2.31	0.45
3:I:125:SER:HA	3:I:128:GLN:OE1	2.17	0.45
3:F:130:ARG:NH1	3:F:144:GLN:O	2.49	0.45
2:H:59:ARG:HE	2:H:59:ARG:HB3	1.62	0.45
3:I:278:TYR:CD1	3:I:299:GLN:HG3	2.52	0.45
2:B:125:TRP:CD1	2:B:130:ARG:HD3	2.52	0.45
2:E:91:GLU:HG2	2:E:110:ARG:NH2	2.32	0.45
1:G:49:ILE:HD12	1:G:52:ASN:HB2	1.98	0.45
2:H:58:GLU:OE1	3:I:45:ARG:NH2	2.50	0.45
2:H:64:ALA:O	2:H:200:LEU:HD21	2.17	0.45
3:F:105:ASP:OD1	3:F:276:THR:HG21	2.17	0.45
2:E:78:GLY:HA2	2:E:174:LEU:HD22	2.00	0.44
3:I:299:GLN:O	3:I:306:ILE:HG23	2.17	0.44
3:F:231:PHE:CD1	3:F:270:VAL:HG11	2.52	0.44
3:I:187:ASP:O	3:I:190:GLU:HB2	2.18	0.44
1:D:68:ARG:C	1:D:69:ASN:HD22	2.25	0.44
1:D:68:ARG:NH2	1:D:83:ARG:HH11	2.14	0.44
2:H:91:GLU:HG2	2:H:110:ARG:HH21	1.82	0.44
3:C:80:LEU:HG	3:C:221:THR:HG22	1.99	0.44
3:C:115:LEU:HD21	3:C:151:ALA:HB2	1.98	0.44
2:E:127:VAL:HG11	3:F:177:ALA:O	2.17	0.44
2:H:70:ARG:HB2	2:H:129:ASP:HB3	2.00	0.44
2:E:153:LEU:HB2	2:E:159:TRP:CZ3	2.52	0.44
3:C:274:VAL:HG12	3:C:274:VAL:O	2.16	0.44
3:F:106:PRO:HD3	3:F:280:GLN:HG3	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:65:ASP:HB3	3:C:300:ARG:HH22	1.83	0.44
3:C:112:LEU:HD13	3:C:185:PHE:CE2	2.52	0.44
2:E:67:ARG:CD	3:F:183:ARG:NH1	2.56	0.44
2:B:66:GLU:HG2	2:B:175:GLU:O	2.18	0.43
2:B:199:LEU:HB3	2:B:200:LEU:H	1.69	0.43
1:G:54:LEU:HD12	3:I:49:HIS:CE1	2.53	0.43
3:I:278:TYR:CE1	3:I:299:GLN:HG3	2.53	0.43
3:C:258:LYS:HA	3:C:258:LYS:HD3	1.88	0.43
2:E:125:TRP:CE2	2:E:130:ARG:NH1	2.86	0.43
2:B:65:VAL:HG12	2:B:66:GLU:N	2.33	0.43
3:C:108:GLY:O	3:C:222:ALA:HA	2.18	0.43
2:H:163:TRP:CG	2:H:164:PRO:HA	2.54	0.43
3:I:308:VAL:HG11	3:I:311:ARG:CZ	2.48	0.43
2:B:151:ARG:NH1	2:B:182:GLU:OE2	2.52	0.43
1:G:52:ASN:OD1	2:H:195:ARG:NH1	2.52	0.43
2:B:161:GLY:N	1:D:72:GLU:HG3	2.34	0.43
2:H:98:ARG:HD2	2:H:98:ARG:HA	1.88	0.43
2:B:104:ALA:HA	3:C:192:ARG:CZ	2.49	0.43
3:C:307:ARG:NE	3:C:309:MET:HG2	2.33	0.43
3:F:59:GLU:CB	3:F:306:ILE:HD12	2.49	0.43
1:G:45:LEU:HD12	1:G:45:LEU:N	2.34	0.43
1:D:69:ASN:O	1:D:83:ARG:HD3	2.19	0.42
3:F:124:ASP:O	3:F:128:GLN:HG3	2.19	0.42
3:C:220:ASN:HA	3:C:245:ARG:HD2	2.02	0.42
3:C:238:ALA:HA	3:C:241:ILE:HD12	2.00	0.42
1:D:47:MET:HE2	1:D:47:MET:HB2	1.87	0.42
2:H:105:ARG:HA	3:I:193:LEU:HD21	1.99	0.42
2:B:169:SER:OG	2:B:170:GLU:N	2.53	0.42
2:E:154:ASP:O	2:E:179:LEU:HD22	2.19	0.42
2:E:174:LEU:HA	2:E:174:LEU:HD23	1.80	0.42
1:G:42:ASP:OD2	1:G:80:TRP:HH2	2.03	0.42
2:H:123:ARG:HA	2:H:137:ARG:O	2.19	0.42
1:G:75:PHE:CE1	2:H:193:LEU:HD13	2.54	0.42
3:I:154:LEU:HD23	3:I:184:SER:HA	2.02	0.42
3:F:118:LYS:H	3:F:213:GLU:CD	2.27	0.42
3:C:253:LYS:HB3	3:C:272:TYR:OH	2.19	0.42
1:D:99:VAL:HG12	1:D:101:VAL:HG13	2.02	0.42
3:C:183:ARG:HB3	3:C:183:ARG:HH11	1.84	0.42
1:D:48:TRP:HH2	2:E:50:LEU:HD23	1.85	0.42
3:F:79:HIS:HA	3:F:220:ASN:HB3	2.02	0.42
3:F:89:THR:HA	3:F:90:PRO:HD3	1.89	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:154:LEU:HD23	3:F:184:SER:HA	2.01	0.42
3:C:112:LEU:HD13	3:C:185:PHE:HE2	1.85	0.41
1:D:120:ARG:HG2	1:D:121:LEU:N	2.35	0.41
3:F:154:LEU:CD2	3:F:184:SER:HA	2.50	0.41
1:G:125:LEU:HD23	1:G:125:LEU:H	1.85	0.41
2:H:198:ARG:NH2	2:H:201:ASP:OD1	2.53	0.41
3:I:117:ARG:HA	3:I:213:GLU:OE1	2.21	0.41
2:B:54:MET:HE2	2:B:54:MET:HA	2.03	0.41
3:F:111:ASN:ND2	3:F:212:PRO:O	2.53	0.41
2:H:111:VAL:HA	2:H:123:ARG:O	2.21	0.41
3:C:153:TRP:CZ3	3:C:180:ALA:HA	2.56	0.41
3:C:300:ARG:HG3	3:C:306:ILE:CD1	2.50	0.41
2:E:201:ASP:N	2:E:201:ASP:OD1	2.54	0.41
1:A:97:VAL:HG21	1:A:125:LEU:CD1	2.49	0.41
1:D:83:ARG:HG3	1:D:84:THR:N	2.36	0.41
1:G:74:GLU:HA	1:G:79:ARG:HA	2.03	0.41
1:G:117:ALA:HB3	1:G:120:ARG:NH2	2.35	0.41
2:H:116:SER:O	2:H:119:THR:HG22	2.20	0.41
1:D:52:ASN:O	1:D:56:GLU:HB2	2.21	0.41
3:I:55:GLU:OE2	3:I:308:VAL:HG21	2.21	0.41
2:B:48:ARG:O	2:B:52:ARG:HG3	2.21	0.41
2:B:161:GLY:H	1:D:72:GLU:HG3	1.85	0.41
3:C:152:ASP:CG	3:C:161:GLN:H	2.29	0.41
2:H:130:ARG:HB3	2:H:134:SER:HB2	2.03	0.41
3:C:62:LEU:HD22	3:C:279:PHE:CE2	2.56	0.41
3:F:59:GLU:CA	3:F:306:ILE:HD12	2.49	0.41
3:F:256:PHE:O	3:F:260:LEU:N	2.53	0.41
2:H:66:GLU:CG	2:H:177:LEU:HD13	2.50	0.41
2:H:108:LEU:HD21	3:I:187:ASP:HB2	2.03	0.41
2:H:113:TRP:CZ2	2:H:122:ARG:HG3	2.55	0.41
2:E:147:ALA:HB3	2:E:186:GLU:HB2	2.02	0.41
3:F:212:PRO:HG2	3:F:278:TYR:OH	2.21	0.41
1:G:45:LEU:HD12	1:G:45:LEU:H	1.84	0.41
2:E:61:LEU:HD23	2:E:61:LEU:HA	1.91	0.40
3:C:192:ARG:NH1	3:C:196:LEU:O	2.49	0.40
2:E:125:TRP:CE2	2:E:136:PRO:HB3	2.56	0.40
1:G:101:VAL:O	1:G:118:ALA:N	2.38	0.40
3:F:79:HIS:HB3	3:F:220:ASN:CG	2.47	0.40
2:H:71:ASP:HB2	2:H:72:GLU:OE2	2.21	0.40
2:B:201:ASP:HA	2:B:202:PRO:HD3	1.96	0.40
1:D:47:MET:HB3	1:D:47:MET:HE3	1.88	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all 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	51/92 (55%)	49 (96%)	1 (2%)	1 (2%)	6 13
1	D	64/92 (70%)	62 (97%)	2 (3%)	0	100 100
1	G	50/92 (54%)	46 (92%)	2 (4%)	2 (4%)	2 4
2	B	160/194 (82%)	151 (94%)	7 (4%)	2 (1%)	9 21
2	E	159/194 (82%)	146 (92%)	11 (7%)	2 (1%)	9 21
2	H	155/194 (80%)	139 (90%)	14 (9%)	2 (1%)	9 21
3	C	253/273 (93%)	229 (90%)	15 (6%)	9 (4%)	2 5
3	F	224/273 (82%)	206 (92%)	17 (8%)	1 (0%)	30 48
3	I	237/273 (87%)	210 (89%)	22 (9%)	5 (2%)	5 13
All	All	1353/1677 (81%)	1238 (92%)	91 (7%)	24 (2%)	6 15

All (24) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	85	GLU
2	B	86	ASN
3	C	96	GLY
3	C	212	PRO
3	F	270	VAL
1	G	68	ARG
3	I	253	LYS
3	I	254	ASP
3	I	267	THR
1	A	92	GLN
3	C	95	ASP
3	C	213	GLU
3	C	286	SER

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Mol	Chain	Res	Type
2	H	203	PRO
2	E	87	ASP
2	E	157	HIS
3	C	90	PRO
2	H	189	HIS
3	C	50	TYR
3	C	287	LEU
1	G	69	ASN
3	I	57	LEU
3	I	264	GLY
3	C	163	GLU

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	31/76 (41%)	31 (100%)	0	100	100
1	D	38/76 (50%)	38 (100%)	0	100	100
1	G	32/76 (42%)	32 (100%)	0	100	100
2	B	125/164 (76%)	125 (100%)	0	100	100
2	E	119/164 (73%)	119 (100%)	0	100	100
2	H	119/164 (73%)	119 (100%)	0	100	100
3	C	170/225 (76%)	170 (100%)	0	100	100
3	F	165/225 (73%)	165 (100%)	0	100	100
3	I	162/225 (72%)	162 (100%)	0	100	100
All	All	961/1395 (69%)	961 (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. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
3	C	158	GLN

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Mol	Chain	Res	Type
3	C	220	ASN
3	C	299	GLN
1	D	58	GLN
2	E	103	GLN
2	E	139	GLN
3	F	158	GLN
3	F	182	ASN
3	F	269	ASN
3	F	280	GLN
3	I	49	HIS

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 9 ligands modelled in this entry, 9 are monoatomic - leaving 0 for Mogul analysis.

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.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

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, 95^{th} 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	63/92 (68%)	-1.34	0	100	100	59, 81, 95, 104	0
1	D	72/92 (78%)	-1.33	0	100	100	66, 82, 102, 106	0
1	G	58/92 (63%)	-1.31	0	100	100	79, 93, 99, 102	0
2	B	162/194 (83%)	-1.52	0	100	100	40, 63, 83, 94	0
2	E	161/194 (82%)	-1.50	0	100	100	58, 73, 89, 103	0
2	H	159/194 (81%)	-1.53	0	100	100	45, 67, 90, 99	0
3	C	261/273 (95%)	-1.49	0	100	100	45, 70, 87, 96	0
3	F	238/273 (87%)	-1.45	0	100	100	60, 80, 98, 104	0
3	I	247/273 (90%)	-1.45	0	100	100	49, 73, 92, 107	0
All	All	1421/1677 (84%)	-1.46	0	100	100	40, 74, 95, 107	0

There are no RSRZ outliers to report.

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

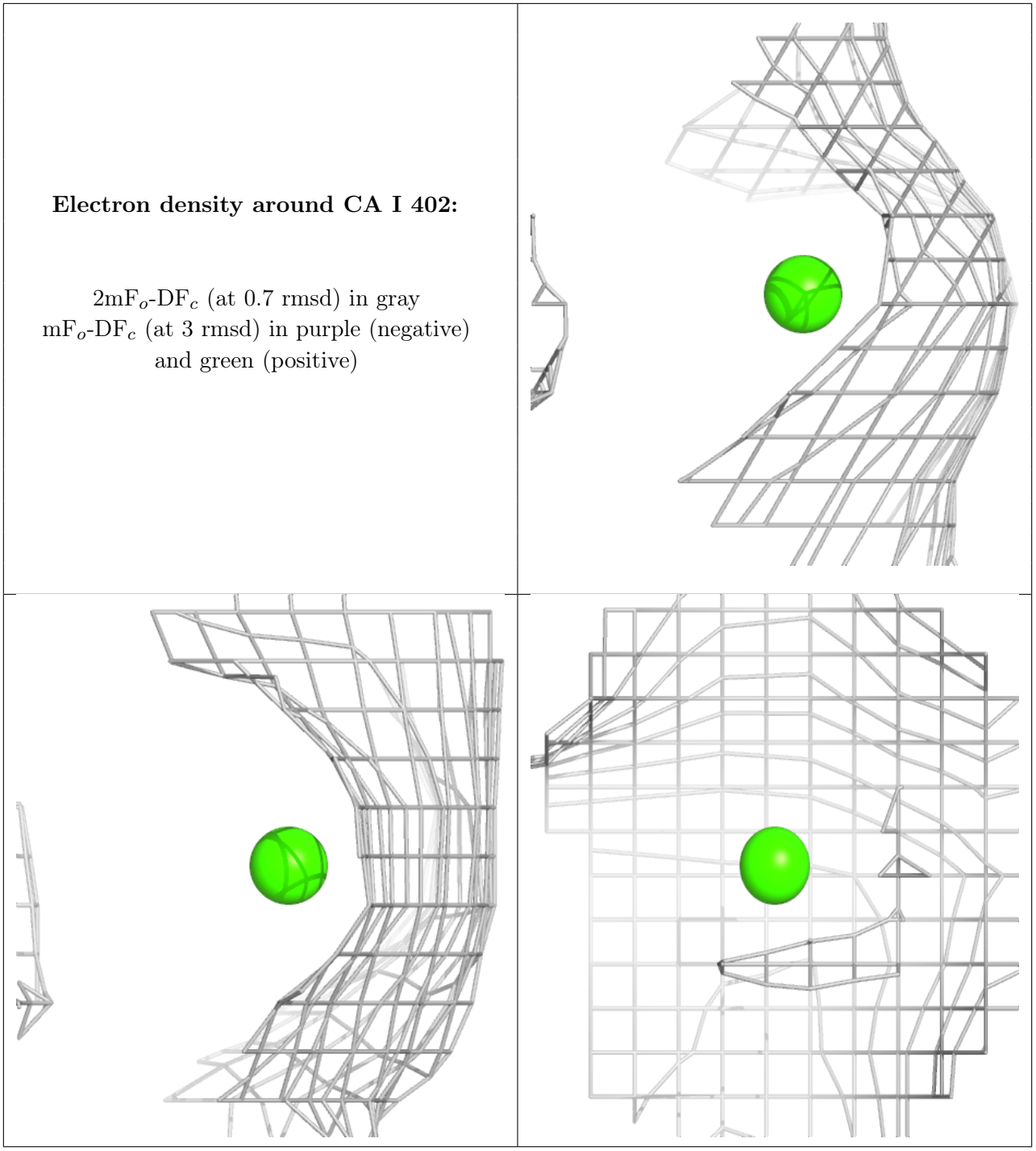
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' 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
4	CA	I	402	1/1	0.99	0.03	79,79,79,79	0
4	CA	C	402	1/1	1.00	0.02	73,73,73,73	0
4	CA	C	403	1/1	1.00	0.02	68,68,68,68	0
4	CA	F	401	1/1	1.00	0.01	94,94,94,94	0
4	CA	F	402	1/1	1.00	0.02	77,77,77,77	0
4	CA	F	403	1/1	1.00	0.02	83,83,83,83	0
4	CA	I	401	1/1	1.00	0.02	88,88,88,88	0
4	CA	C	401	1/1	1.00	0.02	80,80,80,80	0
4	CA	I	403	1/1	1.00	0.01	75,75,75,75	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.

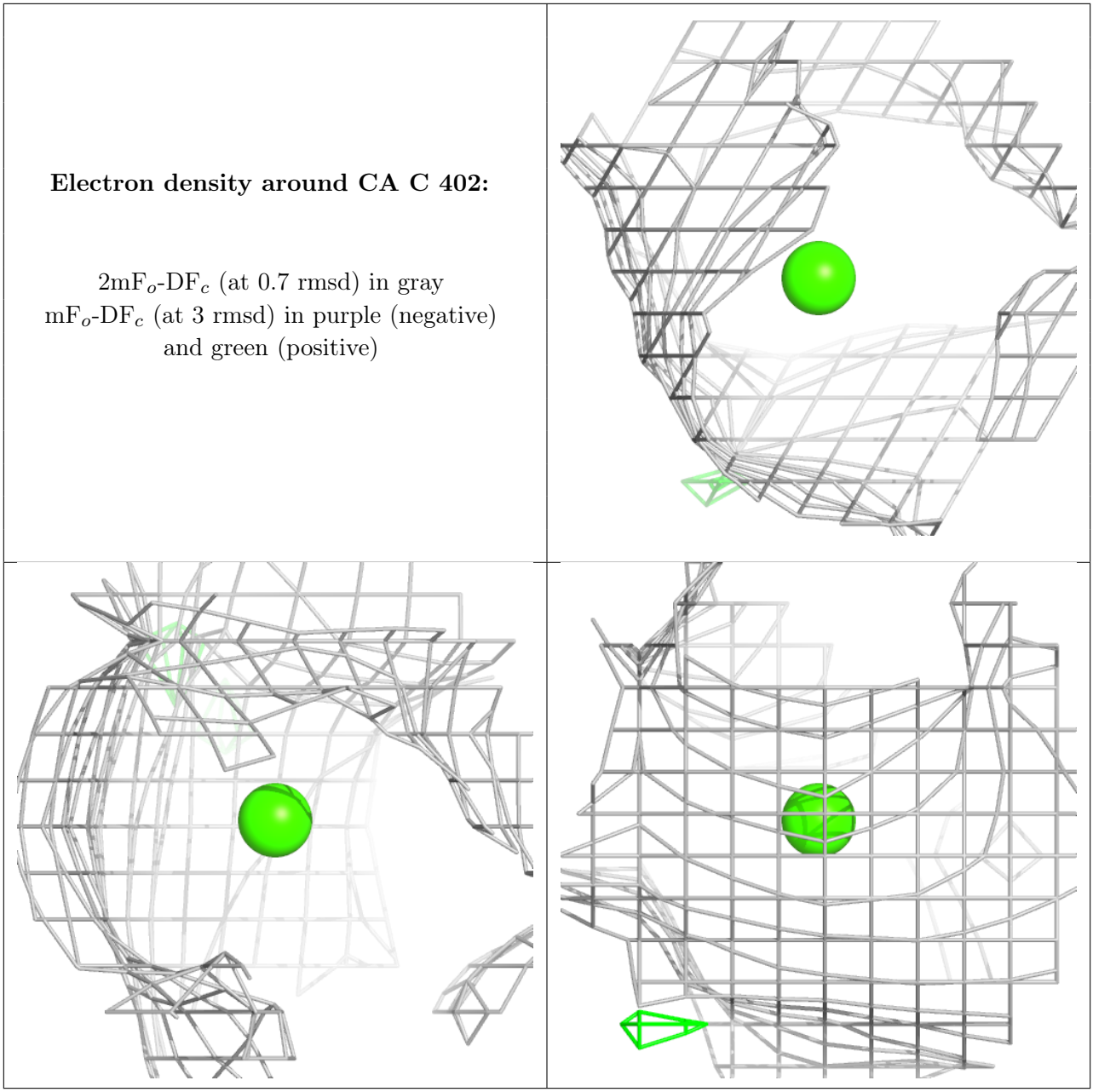
Electron density around CA I 402:

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



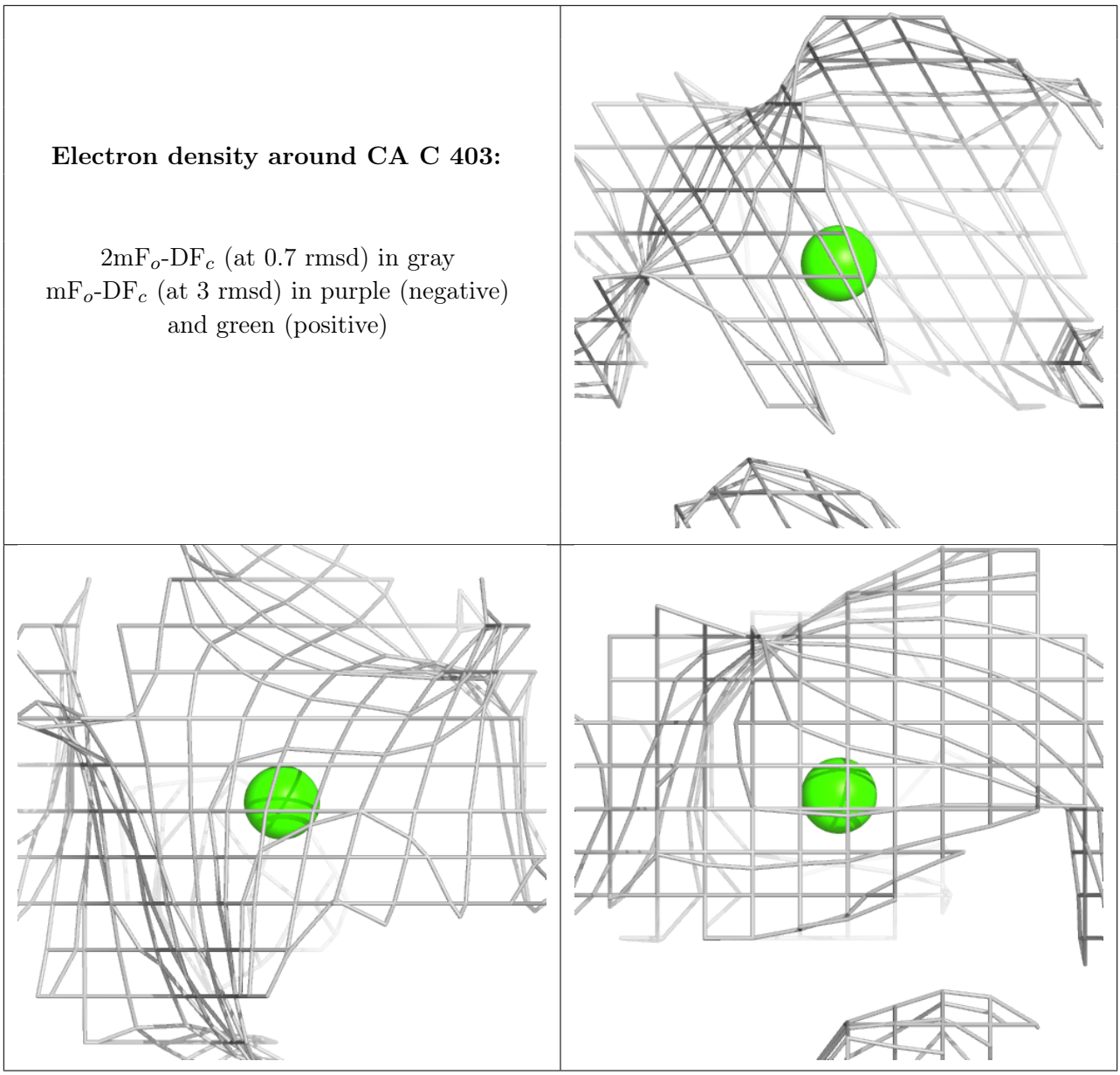
Electron density around CA C 402:

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



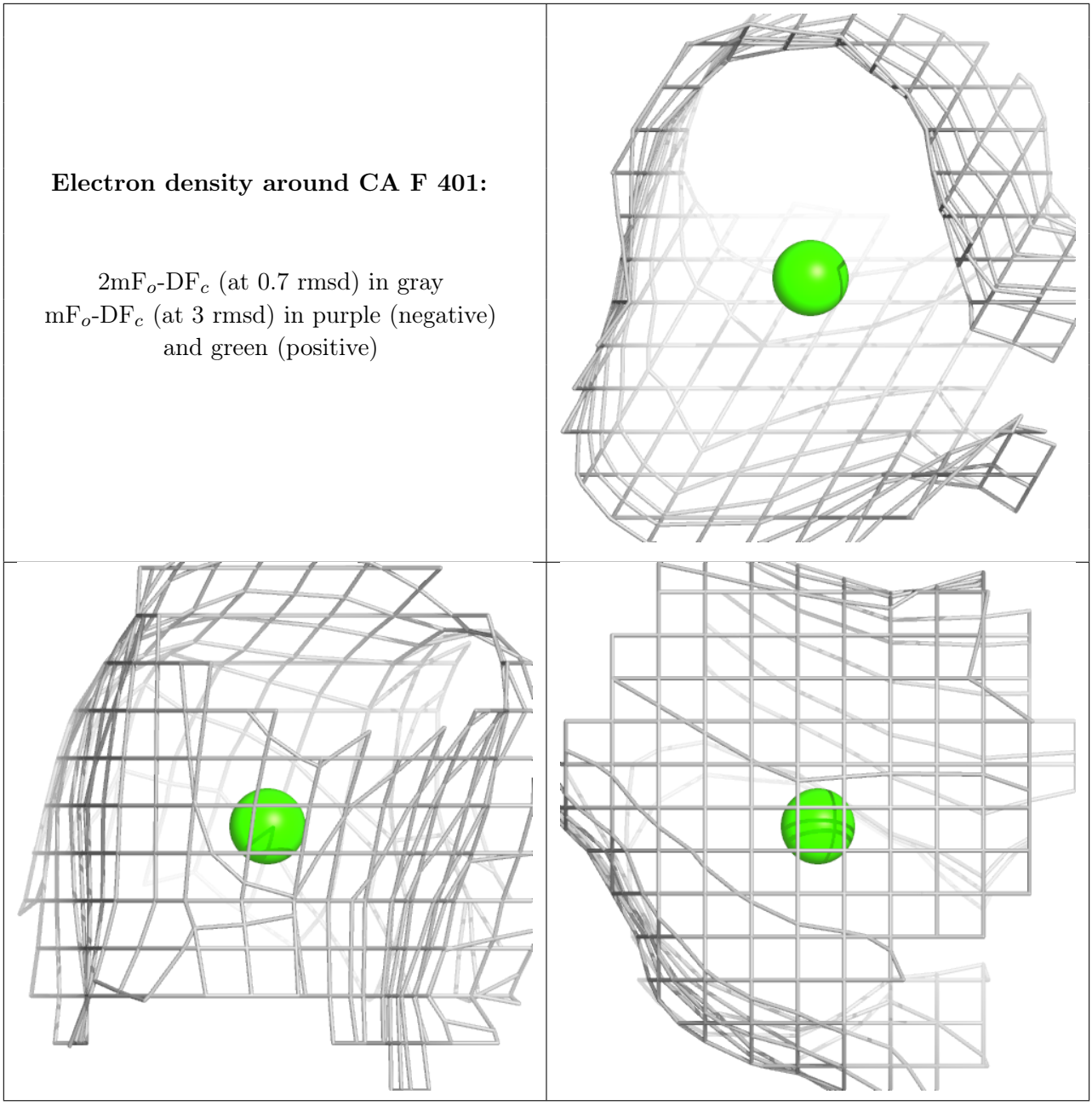
Electron density around CA C 403:

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



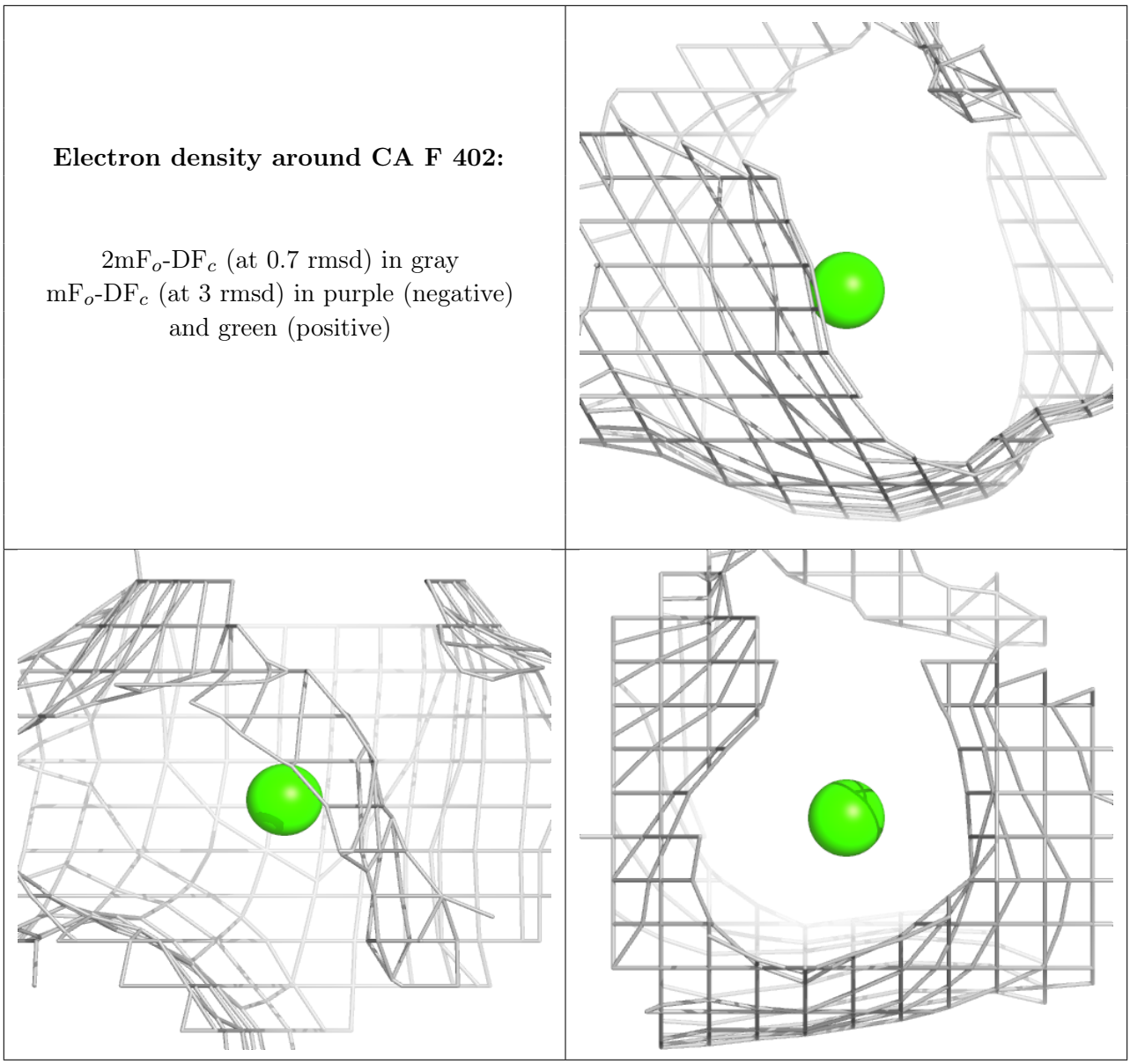
Electron density around CA F 401:

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



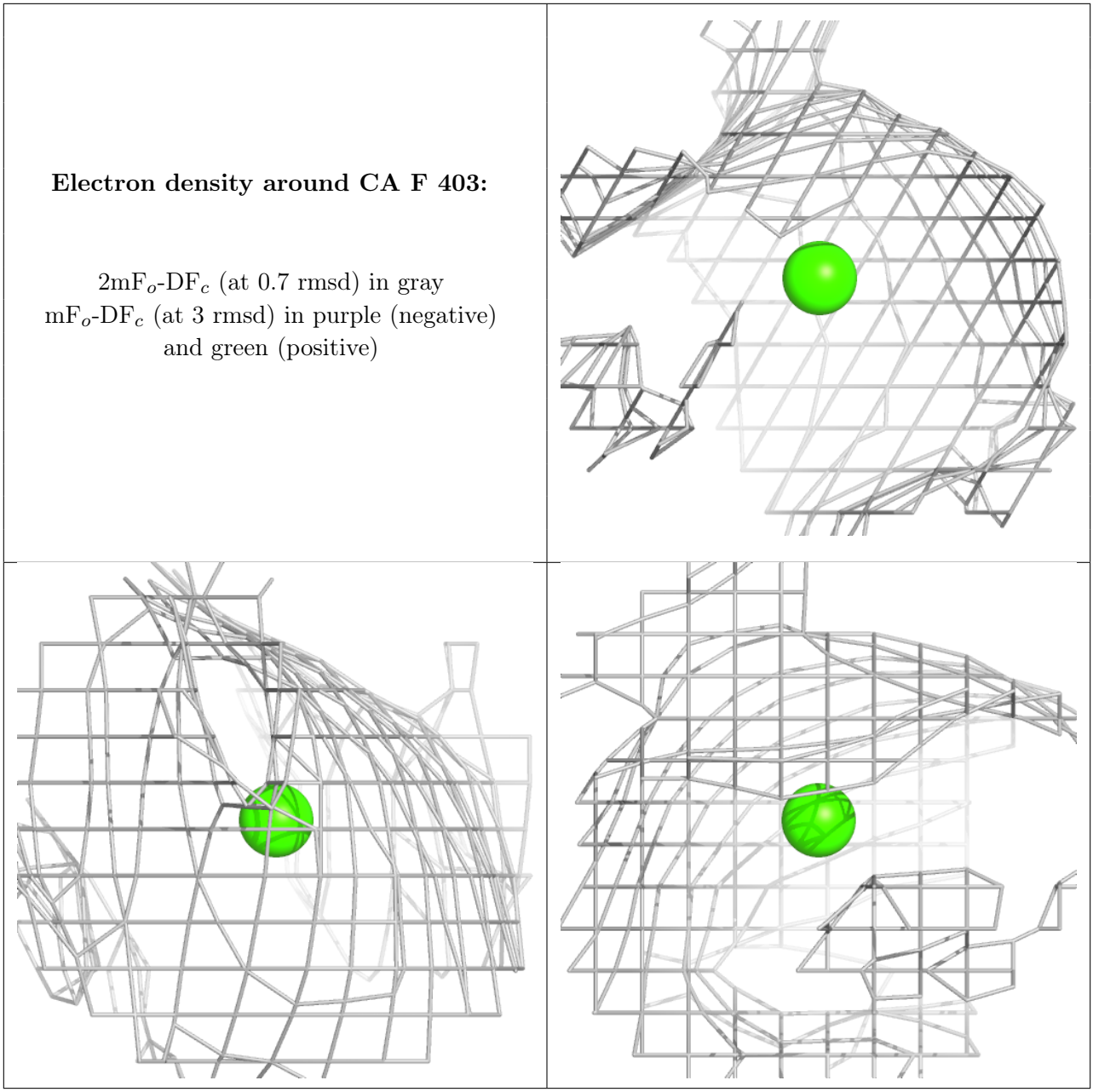
Electron density around CA F 402:

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



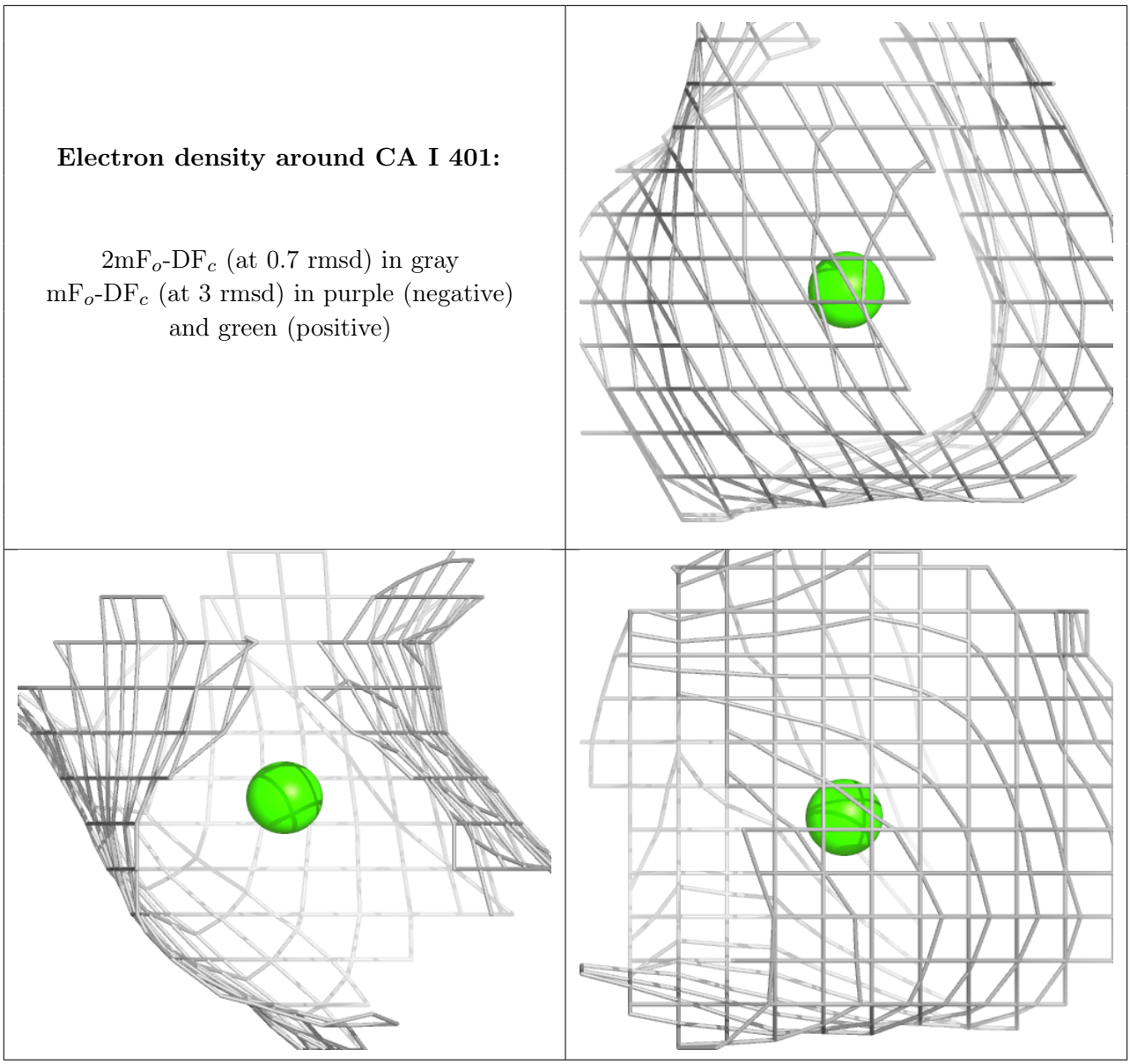
Electron density around CA F 403:

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



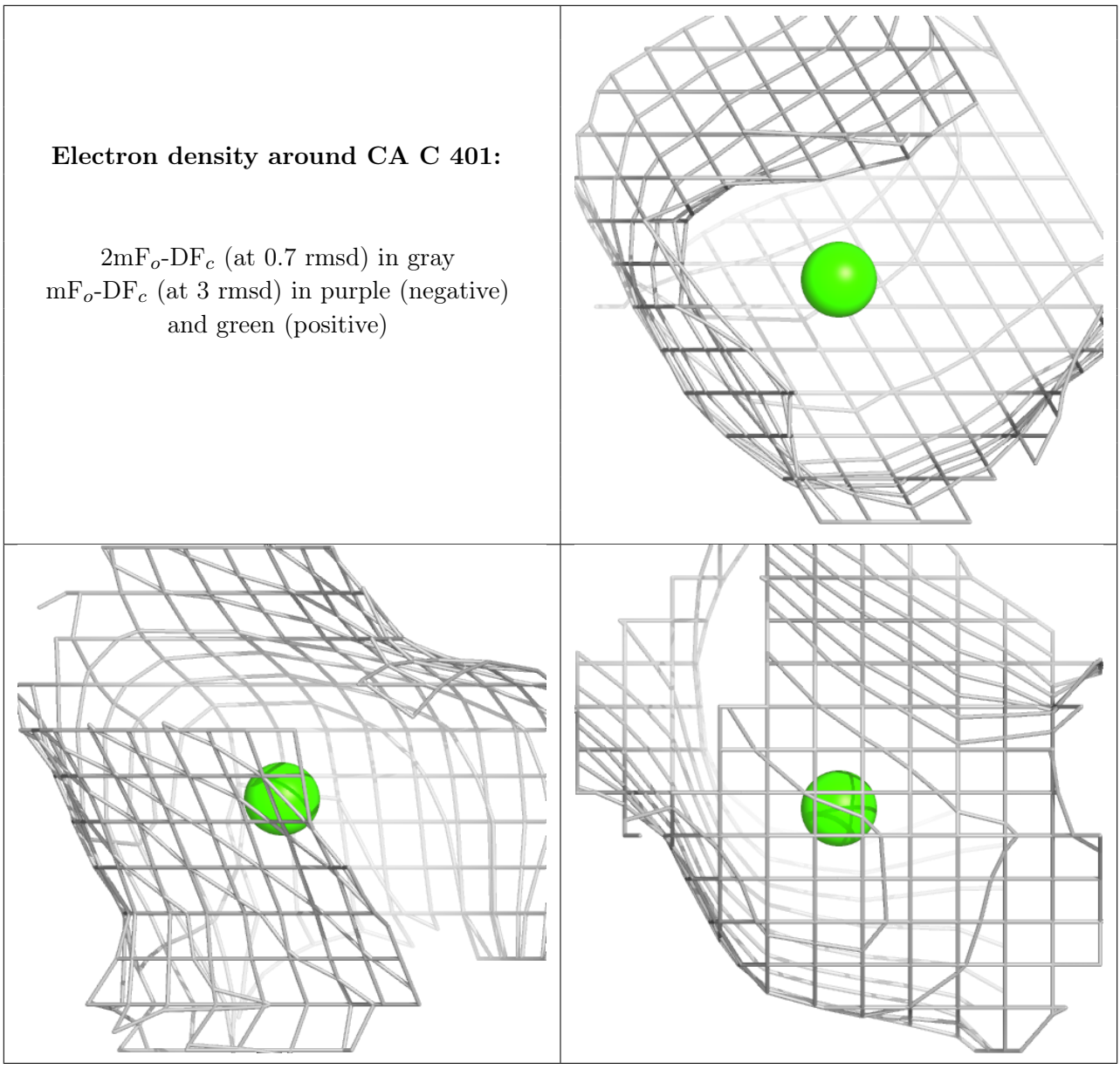
Electron density around CA I 401:

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



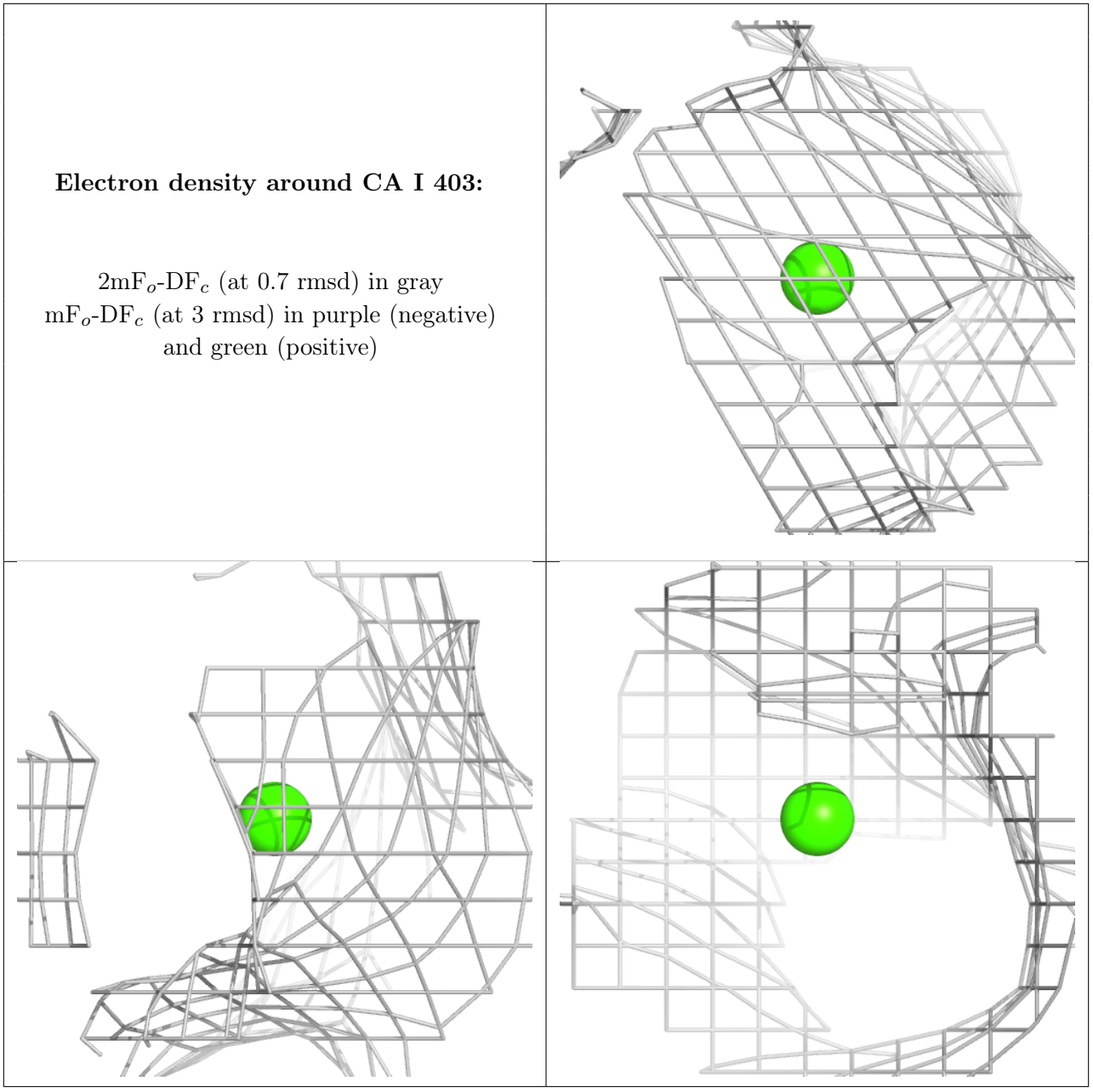
Electron density around CA C 401:

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



Electron density around CA I 403:

$2mF_o$-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.