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Full wwPDB X-ray Structure Validation Report ⓘ

Jan 28, 2025 – 12:13 pm GMT

PDB ID	:	8PML
Title	:	Structure of Nal1 protein , SPIKE allele from japonica rice, construct 46-458
Authors	:	Huang, L.Y.; Rety, S.; Xi, X.G.
Deposited on	:	2023-06-29
Resolution	:	2.95 Å(reported)

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

|		
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

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 2.95 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.
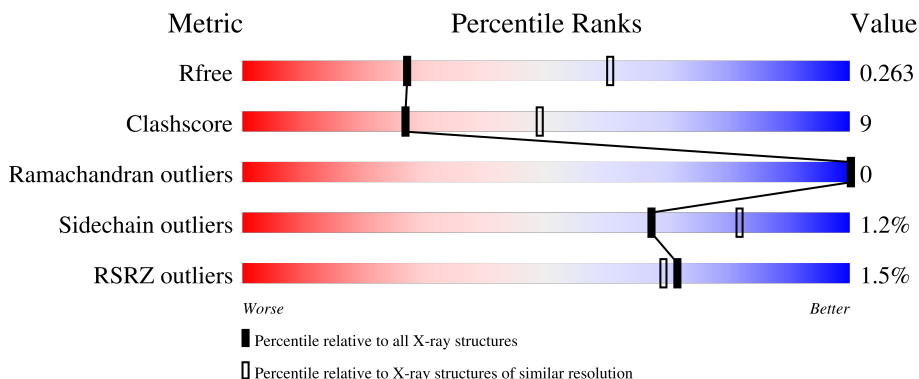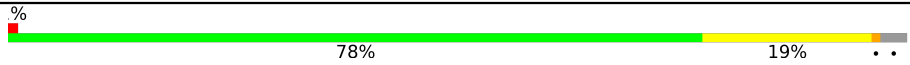

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	1044 (2.98-2.94)
Clashscore	180529	1097 (2.98-2.94)
Ramachandran outliers	177936	1049 (2.98-2.94)
Sidechain outliers	177891	1049 (2.98-2.94)
RSRZ outliers	164620	1044 (2.98-2.94)

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	413	% 79% 17% • •
1	B	413	% 77% 19% • •
1	C	413	% 77% 19% • •
1	D	413	2% 83% 14% •
1	E	413	2% 77% 19% • •

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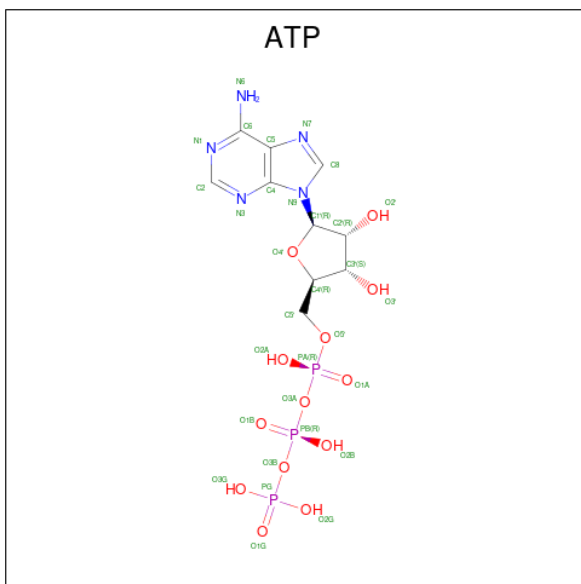| Mol	Chain	Length	Quality of chain
1	F	413	78% 19%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 18777 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 Protein NARROW LEAF 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	401	Total	C	N	O	S	0	0	0
			3090	1958	542	578	12			
1	B	402	Total	C	N	O	S	0	0	0
			3099	1963	543	581	12			
1	C	402	Total	C	N	O	S	0	0	0
			3099	1963	543	581	12			
1	D	402	Total	C	N	O	S	0	0	0
			3099	1963	543	581	12			
1	E	402	Total	C	N	O	S	0	0	0
			3099	1963	543	581	12			
1	F	402	Total	C	N	O	S	0	0	0
			3099	1963	543	581	12			

- Molecule 2 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total 31	C 10	N 5	O 13	P 3	0	0
2	B	1	Total 31	C 10	N 5	O 13	P 3	0	0
2	C	1	Total 31	C 10	N 5	O 13	P 3	0	0
2	D	1	Total 31	C 10	N 5	O 13	P 3	0	0
2	E	1	Total 31	C 10	N 5	O 13	P 3	0	0
2	F	1	Total 31	C 10	N 5	O 13	P 3	0	0

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

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

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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: Protein NARROW LEAF 1

Chain A:

• Molecule 1: Protein NARROW LEAF 1

Chain B:

• Molecule 1: Protein NARROW LEAF 1

Chain C:

N358 K361 G362 I363 T367 R376 S385 L391 E397 G403 G407 N411 R412 G413 R414 H421 Q422 P423 S428 L432 L441 L450 A453 V454 Q455 Q456 Q457 ARG

● Molecule 1: Protein NARROW LEAF 1
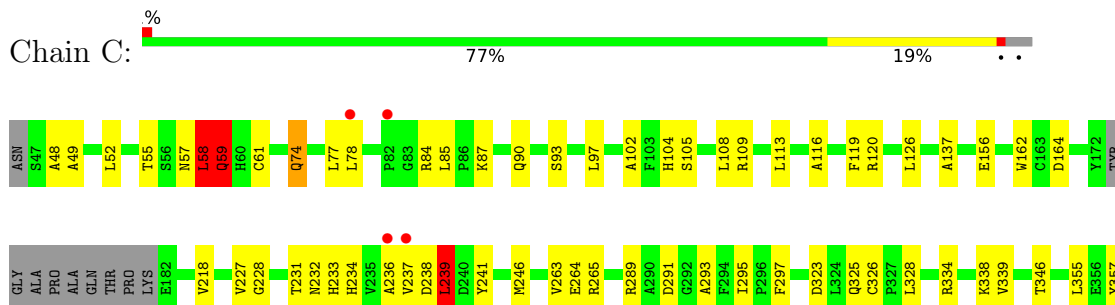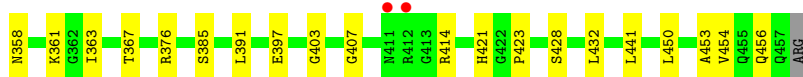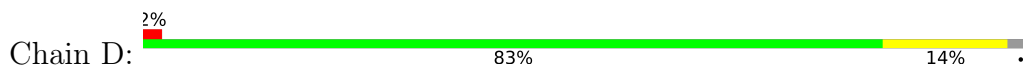
Chain D:

2%

83%　　　14%

ASN S47 F51 S56 Q59 H60 A63 E64 N68 N72 L73 Q74 K75 G76 L77 L78 P79 P82 L85 S93 H104 S105 K106 I107 L108 R109 P152 A153 I154 D164 V165 Y172 TYR GLY ALA PRO ALA GLN THR PRO LYS E182 Q183 E187 H208

R220 N224 K225 Q226 H234 V235 A236 V237 D238 L239 D240 Y241 V263 E264 R265 A266 R289 G292 V321 Q325 K338 V339 N358 D359 T367 S385 G403 I404 I405 W406 G407 G408 T409 A410 N411 R412 L417 T418 H421 W426 T427 S428 L432

Q451 Q455 Q456 Q457 ARG

● Molecule 1: Protein NARROW LEAF 1

Chain E:

2%

77%　　　19%

ASN S47 A48 A49 W53 L58 Q59 A62 Y69 F70 L73 Q74 K75 G76 L77 L78 P79 R80 H81 P82 P86 K87 G88 Q89 F119 R120 I121 R122 L126 N146 Q149 A153 I154 L155 E156 V161 D164 V165 Y172 TYR GLY ALA PRO ALA GLN THR

PRO LYS E182 L188 K191 L192 D196 S207 H208 R220 N224 N232 H233 H234 V235 A236 V237 D238 L239 D240 Y241 P242 N243 Q244 K245 M246 V263 W275 V288 R289 A293 F294 I295 D323 C326 K338 V339 T346 M351 L355 E356 Y357 N358

D359 E360 K361 T367 L370 R376 G403 I404 I405 T409 R412 G413 R414 H421 G422 P423 T427 S428 L432 L450 Q451 D452 A453 V454 Q455 Q456 Q457 ARG

● Molecule 1: Protein NARROW LEAF 1

Chain F:

%

78%　　　19%

ASN S47 L52 T55 S56 N57 L58 Q59 H60 C61 R80 G83 R84 L85 Q89 S93 R120 F135 K142 L145 E156 V161 D164 F170 S171 Y172 TYR GLY ALA PRO ALA GLN THR PRO LYS E182 E187 Q204 G212 K219 R220

N224 K225 Q226 T231 N232 H233 H234 V235 A236 V237 D238 L239 D240 Y241 M246 P249 V263 E264 R265 S268 W275 V288 R289 A290 D291 G292 A293 F294 I295 L324 Q325 K338 V339 G340 R341 Y357 I363 T367 R376 S385 L388 I389 I390 E397

P401 I402 G403 I404 I405 W406 G407 G408 N411 R412 G413 D420 S419 H421 W426 T427 S428 L432 I444 I445 T446 Q456 Q457 ARG

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α, β, γ	175.43Å 193.36Å 84.04Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	87.71 – 2.95 87.71 – 2.95	Depositor EDS
% Data completeness (in resolution range)	77.4 (87.71-2.95) 77.6 (87.71-2.95)	Depositor EDS
R_{merge}	0.24	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.66 (at 2.96Å)	Xtriage
Refinement program	PHENIX 1.21rc1_4903	Depositor
R, R_{free}	0.205 , 0.252 0.212 , 0.263	Depositor DCC
R_{free} test set	2946 reflections (4.79%)	wwPDB-VP
Wilson B-factor (Å^2)	71.9	Xtriage
Anisotropy	0.010	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 43.9	EDS
L-test for twinning[2]	$< |L| > = 0.48, < L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	18777	wwPDB-VP
Average B, all atoms (Å^2)	70.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 46.81 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.0850e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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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 ⓘ

5.1 Standard geometry ⓘ

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

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	0.31	0/3157	0.58	1/4285 (0.0%)
1	B	0.34	1/3166 (0.0%)	0.59	2/4297 (0.0%)
1	C	0.31	0/3166	0.64	5/4297 (0.1%)
1	D	0.31	0/3166	0.58	2/4297 (0.0%)
1	E	0.33	0/3166	0.63	6/4297 (0.1%)
1	F	0.32	0/3166	0.60	3/4297 (0.1%)
All	All	0.32	1/18987 (0.0%)	0.60	19/25770 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	3
1	C	0	4
1	E	0	1
All	All	0	8

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	84	ARG	CB-CG	6.04	1.68	1.52

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	239	LEU	CB-CG-CD1	-11.51	91.43	111.00
1	F	239	LEU	CB-CG-CD2	-9.61	94.67	111.00
1	E	75	LYS	C-N-CA	7.08	137.16	122.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	84	ARG	NE-CZ-NH2	6.69	123.65	120.30
1	E	78	LEU	CA-CB-CG	-6.49	100.37	115.30
1	A	238	ASP	CB-CG-OD1	-6.34	112.59	118.30
1	E	77	LEU	CA-CB-CG	6.26	129.70	115.30
1	E	238	ASP	CB-CG-OD2	-5.81	113.07	118.30
1	F	84	ARG	C-N-CA	5.72	136.00	121.70
1	C	239	LEU	CB-CG-CD2	5.70	120.68	111.00
1	C	74	GLN	CA-CB-CG	5.64	125.81	113.40
1	D	241	TYR	CB-CG-CD2	-5.63	117.62	121.00
1	F	83	GLY	N-CA-C	5.42	126.65	113.10
1	C	59	GLN	N-CA-C	5.26	125.21	111.00
1	E	238	ASP	CB-CG-OD1	5.22	123.00	118.30
1	E	78	LEU	N-CA-C	5.08	124.72	111.00
1	C	58	LEU	C-N-CA	5.07	134.37	121.70
1	B	84	ARG	CB-CG-CD	5.05	124.73	111.60
1	D	75	LYS	C-N-CA	-5.05	111.70	122.30

There are no chirality outliers.

All (8) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	58	LEU	Peptide
1	A	59	GLN	Peptide
1	A	79	PRO	Peptide
1	C	239	LEU	Peptide
1	C	58	LEU	Peptide
1	C	59	GLN	Peptide
1	C	84	ARG	Peptide
1	E	77	LEU	Peptide

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	3090	0	3056	47	0
1	B	3099	0	3062	75	0
1	C	3099	0	3062	68	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	D	3099	0	3062	44	0
1	E	3099	0	3062	64	0
1	F	3099	0	3062	67	0
2	A	31	0	12	0	0
2	B	31	0	12	0	0
2	C	31	0	12	0	0
2	D	31	0	12	0	0
2	E	31	0	12	2	0
2	F	31	0	12	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
3	E	1	0	0	0	0
3	F	1	0	0	0	0
All	All	18777	0	18438	338	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 9.

All (338) 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:105:SER:HB2	1:B:109:ARG:HH12	1.29	0.94
1:E:238:ASP:OD2	1:E:243:ASN:HB2	1.72	0.88
1:F:232:ASN:HD21	1:F:385:SER:HB2	1.37	0.87
1:B:105:SER:HB2	1:B:109:ARG:NH1	1.92	0.85
1:A:238:ASP:OD1	1:A:243:ASN:N	2.08	0.84
1:A:236:ALA:HB1	1:A:263:VAL:HG21	1.61	0.83
1:B:81:HIS:CE1	1:B:84:ARG:HA	2.14	0.82
1:A:61:CYS:HA	1:A:64:GLU:HB3	1.61	0.82
1:A:60:HIS:O	1:A:64:GLU:N	2.11	0.81
1:B:232:ASN:HD21	1:B:385:SER:HB2	1.49	0.78
1:C:234:HIS:NE2	1:C:291:ASP:OD2	2.17	0.77
1:B:81:HIS:ND1	1:B:81:HIS:O	2.17	0.77
1:D:264:GLU:HG2	1:D:265:ARG:HG3	1.65	0.76
1:F:232:ASN:HB2	1:F:291:ASP:HB3	1.66	0.75
1:F:224:ASN:HD21	1:F:226:GLN:HG2	1.50	0.74
1:C:105:SER:O	1:C:109:ARG:HG2	1.88	0.74
1:E:208:HIS:HB2	1:E:243:ASN:OD1	1.87	0.74
1:B:408:GLY:O	1:B:411:ASN:ND2	2.20	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:355:LEU:HD12	1:E:370:LEU:HD12	1.67	0.74
1:D:224:ASN:HD21	1:D:226:GLN:HG2	1.51	0.74
1:C:237:VAL:HG21	1:F:239:LEU:HD22	1.70	0.74
1:B:224:ASN:HD21	1:B:226:GLN:HG2	1.51	0.74
1:A:264:GLU:HG2	1:A:265:ARG:HG3	1.71	0.71
1:E:207:SER:HB2	1:E:243:ASN:HB3	1.71	0.71
1:B:207:SER:HB2	1:B:243:ASN:HB2	1.72	0.71
1:E:70:PHE:HA	1:E:73:LEU:HD12	1.71	0.71
1:A:81:HIS:CG	1:A:82:PRO:HD2	2.26	0.70
1:D:220:ARG:NH2	1:D:224:ASN:OD1	2.25	0.70
1:B:232:ASN:O	1:B:235:VAL:HG12	1.91	0.70
1:B:259:TYR:OH	1:E:59:GLN:NE2	2.25	0.69
1:F:59:GLN:OE1	1:F:61:CYS:N	2.25	0.69
1:F:412:ARG:HB2	1:F:426:TRP:O	1.91	0.69
1:E:153:ALA:HA	1:E:165:VAL:HB	1.74	0.69
1:B:320:LYS:HD2	1:B:400:ARG:HH21	1.56	0.69
1:A:355:LEU:HD12	1:A:370:LEU:HD12	1.73	0.69
1:A:59:GLN:O	1:A:61:CYS:N	2.26	0.68
1:C:376:ARG:HD2	1:C:421:HIS:CD2	2.29	0.68
1:B:241:TYR:OH	1:E:359:ASP:OD2	2.07	0.68
1:B:264:GLU:HG2	1:B:265:ARG:HG3	1.76	0.68
1:B:60:HIS:HA	1:B:63:ALA:HB3	1.76	0.67
1:A:306:VAL:HG23	1:A:450:LEU:HD21	1.75	0.67
1:C:264:GLU:HG2	1:C:265:ARG:HG3	1.75	0.67
1:B:109:ARG:NH1	1:B:356:GLU:OE2	2.28	0.67
1:A:238:ASP:CG	1:A:243:ASN:H	1.99	0.66
1:F:264:GLU:HG2	1:F:265:ARG:HG3	1.76	0.66
1:D:418:THR:H	1:D:421:HIS:CE1	2.14	0.66
1:E:367:THR:HG21	1:E:428:SER:HB3	1.78	0.66
1:D:367:THR:HG21	1:D:428:SER:HB3	1.79	0.65
1:A:86:PRO:HD2	1:A:89:GLN:NE2	2.12	0.65
1:F:367:THR:HG21	1:F:428:SER:HB3	1.80	0.64
1:F:232:ASN:ND2	1:F:385:SER:HB2	2.09	0.64
1:C:233:HIS:HB3	1:C:293:ALA:HB2	1.80	0.64
1:C:233:HIS:O	1:C:237:VAL:HG23	1.98	0.64
1:B:81:HIS:CE1	1:B:84:ARG:HD3	2.33	0.63
1:B:232:ASN:HB2	1:B:291:ASP:HB3	1.80	0.63
1:D:417:LEU:H	1:D:421:HIS:HE1	1.46	0.63
1:A:420:ASP:OD1	1:A:421:HIS:N	2.31	0.63
1:C:233:HIS:CE1	1:F:239:LEU:HD13	2.33	0.63
1:A:376:ARG:HD2	1:A:421:HIS:CE1	2.34	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:57:ASN:HB2	1:C:59:GLN:HG3	1.79	0.63
1:D:412:ARG:NH1	1:D:426:TRP:O	2.32	0.63
1:C:233:HIS:HE1	1:F:239:LEU:HD13	1.63	0.62
1:E:409:THR:O	1:E:412:ARG:NH1	2.32	0.62
1:B:120:ARG:HH21	1:B:164:ASP:HB3	1.63	0.62
1:F:408:GLY:N	1:F:411:ASN:OD1	2.24	0.62
1:F:80:ARG:NE	1:F:156:GLU:OE1	2.30	0.61
1:F:224:ASN:ND2	1:F:226:GLN:HG2	2.15	0.61
1:B:408:GLY:N	1:B:411:ASN:OD1	2.27	0.61
1:E:69:TYR:O	1:E:73:LEU:HG	1.99	0.61
1:C:414:ARG:HB3	1:C:423:PRO:HB2	1.81	0.61
1:F:212:GLY:HA2	1:F:341:ARG:HH21	1.66	0.61
1:E:86:PRO:HD2	1:E:89:GLN:NE2	2.16	0.61
1:B:237:VAL:HG21	1:E:239:LEU:HG	1.82	0.60
1:A:241:TYR:OH	1:D:359:ASP:OD2	2.20	0.60
1:D:60:HIS:CD2	1:D:64:GLU:HB2	2.37	0.60
1:A:81:HIS:CD2	1:A:82:PRO:HD2	2.36	0.60
1:C:234:HIS:NE2	1:C:407:GLY:O	2.35	0.60
1:B:289:ARG:HH22	1:B:357:TYR:HD2	1.48	0.59
1:A:233:HIS:ND1	1:A:291:ASP:OD1	2.35	0.59
1:B:367:THR:HG21	1:B:428:SER:HB3	1.84	0.59
1:C:237:VAL:HG21	1:F:239:LEU:CD2	2.32	0.59
1:C:120:ARG:HH21	1:C:164:ASP:HB3	1.67	0.59
1:C:246:MET:HG3	1:C:295:ILE:HG12	1.85	0.59
1:F:80:ARG:HE	1:F:156:GLU:CD	2.05	0.59
1:B:224:ASN:ND2	1:B:226:GLN:HG2	2.16	0.59
1:F:246:MET:HG3	1:F:295:ILE:HG12	1.85	0.59
1:D:403:GLY:HA2	1:D:432:LEU:HB2	1.85	0.58
1:E:122:ARG:NH1	2:E:1001:ATP:O1B	2.36	0.58
1:B:85:LEU:HD12	1:B:162:TRP:CD1	2.39	0.58
1:D:289:ARG:HD3	1:D:406:TRP:CZ2	2.39	0.58
1:E:238:ASP:OD2	1:E:243:ASN:CB	2.48	0.57
1:D:224:ASN:ND2	1:D:226:GLN:HG2	2.18	0.57
1:F:403:GLY:HA2	1:F:432:LEU:HB2	1.86	0.57
1:F:204:GLN:NE2	1:F:249:PRO:O	2.30	0.56
1:C:234:HIS:CD2	1:C:407:GLY:O	2.58	0.56
1:C:363:ILE:HD12	1:F:241:TYR:CE2	2.39	0.56
1:F:120:ARG:HH21	1:F:164:ASP:HB3	1.69	0.56
1:C:238:ASP:HB3	1:C:239:LEU:HD22	1.87	0.56
1:D:208:HIS:CG	1:D:241:TYR:HE2	2.23	0.56
1:B:212:GLY:HA2	1:B:341:ARG:HH21	1.71	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:403:GLY:HA2	1:A:432:LEU:HB2	1.87	0.56
1:E:403:GLY:HA2	1:E:432:LEU:HB2	1.87	0.56
1:B:241:TYR:CE2	1:E:361:LYS:HD2	2.41	0.56
1:B:403:GLY:HA2	1:B:432:LEU:HB2	1.87	0.56
1:E:289:ARG:NH1	1:E:367:THR:OG1	2.36	0.55
1:A:53:TRP:O	1:A:55:THR:HG23	2.06	0.55
1:A:303:ILE:O	1:A:306:VAL:HG22	2.07	0.55
1:D:208:HIS:CG	1:D:241:TYR:CE2	2.94	0.55
1:B:81:HIS:NE2	1:B:85:LEU:HD22	2.22	0.54
1:C:119:PHE:HB2	1:C:126:LEU:HD22	1.88	0.54
1:E:409:THR:HG22	1:E:412:ARG:HH12	1.72	0.54
1:E:207:SER:CB	1:E:243:ASN:HB3	2.36	0.54
1:F:212:GLY:HA2	1:F:341:ARG:NH2	2.23	0.54
1:A:363:ILE:HG13	1:D:241:TYR:OH	2.07	0.54
1:C:52:LEU:HB2	1:F:52:LEU:HB2	1.90	0.54
1:E:289:ARG:HH22	1:E:357:TYR:HD2	1.56	0.54
1:C:109:ARG:HH12	1:C:358:ASN:HD22	1.55	0.54
1:D:208:HIS:CD2	1:D:241:TYR:HE2	2.26	0.53
1:C:109:ARG:NH1	1:C:358:ASN:HD22	2.06	0.53
1:E:338:LYS:HE3	1:E:346:THR:OG1	2.08	0.53
1:F:93:SER:HB2	1:F:325:GLN:HA	1.90	0.53
1:C:361:LYS:HB2	1:F:241:TYR:OH	2.09	0.53
1:E:450:LEU:O	1:E:454:VAL:HG13	2.09	0.53
1:B:236:ALA:HB1	1:B:263:VAL:HG21	1.91	0.52
1:B:241:TYR:CZ	1:E:361:LYS:HD2	2.45	0.52
1:B:302:ASP:OD1	1:B:304:SER:OG	2.21	0.52
1:E:119:PHE:HB2	1:E:126:LEU:HD22	1.91	0.52
1:F:85:LEU:HD12	1:F:89:GLN:NE2	2.24	0.52
1:E:414:ARG:HB3	1:E:423:PRO:HB2	1.91	0.52
1:A:191:LYS:HB3	1:A:196:ASP:HB2	1.92	0.52
1:E:191:LYS:HB3	1:E:196:ASP:HB2	1.91	0.52
1:B:81:HIS:HE1	1:B:84:ARG:CG	2.23	0.52
1:D:93:SER:HB2	1:D:325:GLN:HA	1.91	0.52
1:E:120:ARG:HH21	1:E:164:ASP:HB3	1.74	0.52
1:C:113:LEU:HD11	1:C:137:ALA:HB2	1.92	0.52
1:F:408:GLY:O	1:F:411:ASN:ND2	2.43	0.52
1:A:85:LEU:HD12	1:A:89:GLN:NE2	2.25	0.51
1:C:57:ASN:HB2	1:C:59:GLN:CG	2.39	0.51
1:D:385:SER:HB3	1:D:407:GLY:HA2	1.92	0.51
1:E:153:ALA:O	1:E:154:ILE:HG12	2.10	0.51
1:A:367:THR:HG21	1:A:428:SER:HB2	1.91	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:172:TYR:HA	1:F:413:GLY:HA3	1.92	0.51
1:F:289:ARG:HD3	1:F:406:TRP:CZ2	2.45	0.51
1:C:97:LEU:HD21	1:C:328:LEU:HD11	1.92	0.51
1:D:187:GLU:HG2	1:F:419:SER:OG	2.10	0.51
1:D:289:ARG:NH1	1:D:367:THR:OG1	2.41	0.51
1:E:238:ASP:C	1:E:239:LEU:HD22	2.31	0.51
1:C:236:ALA:HB1	1:C:263:VAL:HG21	1.91	0.51
1:C:233:HIS:CE1	1:F:239:LEU:CD1	2.95	0.50
1:D:289:ARG:HH11	1:D:367:THR:HG1	1.60	0.50
1:D:451:GLN:O	1:D:455:GLN:HG2	2.11	0.50
1:A:268:SER:OG	1:D:238:ASP:OD2	2.08	0.50
1:C:334:ARG:HG2	1:C:391:LEU:HD22	1.93	0.50
1:D:236:ALA:HB2	1:D:263:VAL:HG21	1.93	0.50
1:A:239:LEU:HD11	1:D:234:HIS:CD2	2.47	0.50
1:F:231:THR:O	1:F:293:ALA:N	2.45	0.50
1:B:85:LEU:HD12	1:B:162:TRP:CG	2.47	0.49
1:C:238:ASP:O	1:C:239:LEU:HB2	2.11	0.49
1:D:68:ASN:OD1	1:D:72:ASN:ND2	2.45	0.49
1:B:51:PHE:HE2	1:E:53:TRP:CD2	2.30	0.49
1:B:231:THR:O	1:B:293:ALA:N	2.45	0.49
1:F:238:ASP:HB2	1:F:241:TYR:O	2.12	0.49
1:B:220:ARG:HH22	1:B:226:GLN:HG3	1.77	0.49
1:F:338:LYS:HD3	1:F:405:ILE:HD11	1.95	0.49
1:B:154:ILE:HD12	1:B:164:ASP:HA	1.93	0.49
1:B:56:SER:HB3	1:E:49:ALA:HA	1.95	0.49
1:D:417:LEU:HB2	1:D:421:HIS:CE1	2.48	0.49
1:F:233:HIS:O	1:F:237:VAL:HG23	2.12	0.49
1:B:233:HIS:CD2	1:E:239:LEU:HD12	2.48	0.49
1:B:405:ILE:HD13	1:B:427:THR:HG21	1.95	0.49
1:C:93:SER:HB2	1:C:325:GLN:HA	1.95	0.49
1:F:233:HIS:CE1	1:F:291:ASP:HA	2.48	0.49
1:F:275:TRP:CD1	1:F:288:VAL:HG11	2.48	0.49
1:C:241:TYR:CE2	1:F:363:ILE:HD12	2.48	0.49
1:B:275:TRP:CD1	1:B:288:VAL:HG11	2.48	0.48
1:C:74:GLN:HA	1:C:77:LEU:CD1	2.43	0.48
1:C:338:LYS:HG2	1:C:339:VAL:N	2.28	0.48
1:E:78:LEU:C	1:E:80:ARG:H	2.15	0.48
1:E:188:LEU:O	1:E:192:LEU:HD13	2.13	0.48
1:E:239:LEU:HD22	1:E:239:LEU:N	2.28	0.48
1:F:237:VAL:HG12	1:F:238:ASP:H	1.78	0.48
1:B:397:GLU:OE1	1:B:397:GLU:N	2.40	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:58:LEU:HD23	1:C:61:CYS:SG	2.54	0.48
1:B:58:LEU:HG	1:B:61:CYS:HB3	1.96	0.48
1:B:263:VAL:HA	1:B:295:ILE:HG13	1.96	0.48
1:D:74:GLN:O	1:D:77:LEU:HG	2.14	0.48
1:D:106:LYS:HA	1:D:109:ARG:HG2	1.96	0.48
1:F:338:LYS:HG2	1:F:339:VAL:N	2.29	0.48
1:B:188:LEU:O	1:B:192:LEU:HD13	2.14	0.47
1:C:48:ALA:HB3	1:F:55:THR:OG1	2.14	0.47
1:C:104:HIS:O	1:C:108:LEU:HB2	2.13	0.47
1:E:338:LYS:HG2	1:E:339:VAL:N	2.29	0.47
1:B:246:MET:HG3	1:B:295:ILE:HG12	1.95	0.47
1:A:306:VAL:CG2	1:A:450:LEU:HD21	2.44	0.47
1:B:338:LYS:HD3	1:B:405:ILE:CD1	2.44	0.47
1:A:265:ARG:NH2	1:A:440:GLU:OE1	2.48	0.47
1:B:244:GLN:O	1:B:263:VAL:HG23	2.14	0.47
1:C:450:LEU:O	1:C:454:VAL:HG13	2.15	0.47
1:F:397:GLU:OE1	1:F:397:GLU:N	2.41	0.47
1:B:109:ARG:HA	1:B:112:SER:HG	1.80	0.47
1:E:79:PRO:HB3	1:E:156:GLU:OE2	2.15	0.47
1:C:289:ARG:HH22	1:C:357:TYR:HD2	1.63	0.47
1:F:233:HIS:CE1	1:F:268:SER:HA	2.50	0.46
1:F:289:ARG:HH22	1:F:357:TYR:HD2	1.61	0.46
1:B:85:LEU:HA	1:B:85:LEU:HD13	1.72	0.46
1:D:338:LYS:HD3	1:D:405:ILE:HD11	1.97	0.46
1:C:323:ASP:HB3	1:C:326:CYS:SG	2.55	0.46
1:E:453:ALA:HA	1:E:456:GLN:HE21	1.81	0.46
1:B:234:HIS:ND1	1:B:407:GLY:O	2.48	0.46
1:F:239:LEU:O	1:F:239:LEU:HG	2.16	0.46
1:A:246:MET:HG3	1:A:295:ILE:HG12	1.96	0.46
1:B:289:ARG:HD3	1:B:406:TRP:CZ2	2.51	0.46
1:C:376:ARG:HD2	1:C:421:HIS:CG	2.50	0.46
1:E:376:ARG:CZ	1:E:421:HIS:ND1	2.79	0.46
1:C:85:LEU:HB3	1:C:162:TRP:CD1	2.51	0.46
1:E:146:ASN:OD1	1:E:149:GLN:N	2.45	0.46
1:B:212:GLY:C	1:B:341:ARG:HE	2.19	0.46
1:B:338:LYS:HD3	1:B:405:ILE:HD11	1.96	0.46
1:C:218:VAL:HG21	1:C:441:LEU:HD13	1.98	0.46
1:C:232:ASN:HD21	1:C:385:SER:HB3	1.81	0.46
1:E:263:VAL:HA	1:E:295:ILE:HG13	1.97	0.46
1:E:451:GLN:O	1:E:454:VAL:HG22	2.16	0.46
1:F:456:GLN:O	1:F:456:GLN:HG3	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:220:ARG:HH22	1:F:226:GLN:HG3	1.79	0.46
1:C:397:GLU:OE1	1:C:397:GLU:N	2.40	0.45
1:E:86:PRO:HD2	1:E:89:GLN:HE21	1.81	0.45
1:A:71:GLY:O	1:A:74:GLN:HB3	2.15	0.45
1:E:275:TRP:CD1	1:E:288:VAL:HG11	2.51	0.45
1:F:233:HIS:CD2	1:F:234:HIS:HD2	2.35	0.45
1:F:405:ILE:HD13	1:F:427:THR:HG21	1.99	0.45
1:A:85:LEU:HD12	1:A:89:GLN:HE21	1.82	0.45
1:A:451:GLN:HA	1:A:454:VAL:HG12	1.99	0.45
1:E:89:GLN:O	1:E:161:VAL:HA	2.15	0.45
1:F:135:PHE:HB3	1:F:170:PHE:CB	2.47	0.45
1:A:219:LYS:HB3	1:A:444:ILE:HD11	1.99	0.45
1:D:152:PRO:O	1:D:165:VAL:HB	2.17	0.45
1:B:109:ARG:HA	1:B:112:SER:OG	2.16	0.45
1:D:74:GLN:OE1	1:D:77:LEU:HD11	2.17	0.45
1:F:142:LYS:HA	1:F:145:LEU:HD12	1.98	0.44
1:B:338:LYS:HE3	1:B:346:THR:OG1	2.17	0.44
1:B:414:ARG:HB3	1:B:423:PRO:HB2	1.99	0.44
1:C:87:LYS:HE2	1:C:90:GLN:OE1	2.17	0.44
1:B:142:LYS:HA	1:B:145:LEU:HD12	1.99	0.44
1:D:78:LEU:N	1:D:79:PRO:HD3	2.33	0.44
1:E:220:ARG:NH2	1:E:224:ASN:HB3	2.33	0.44
1:F:93:SER:HB2	1:F:324:LEU:O	2.17	0.44
1:A:244:GLN:HG2	1:A:262:ALA:HB1	1.98	0.44
1:B:135:PHE:HB3	1:B:170:PHE:CB	2.47	0.44
1:B:318:ASP:O	1:B:400:ARG:HD2	2.18	0.44
1:C:58:LEU:HB3	1:C:61:CYS:SG	2.58	0.44
1:F:445:ILE:HG13	1:F:446:THR:HG23	2.00	0.44
1:B:338:LYS:HG2	1:B:339:VAL:N	2.32	0.44
1:E:338:LYS:HD3	1:E:405:ILE:HD11	1.99	0.44
1:E:220:ARG:HH21	1:E:224:ASN:HB3	1.83	0.43
1:F:236:ALA:HB1	1:F:263:VAL:HG21	2.00	0.43
1:C:85:LEU:HD13	1:C:85:LEU:HA	1.84	0.43
1:E:405:ILE:HD13	1:E:427:THR:HG21	2.01	0.43
1:C:49:ALA:HA	1:F:56:SER:HB3	2.01	0.43
1:A:294:PHE:HB2	1:A:441:LEU:HD11	2.01	0.43
1:D:60:HIS:CE1	1:D:63:ALA:HB3	2.54	0.43
1:F:390:ILE:HA	1:F:401:PRO:HA	2.00	0.43
1:C:116:ALA:HB2	1:C:355:LEU:HD12	2.01	0.43
1:D:60:HIS:O	1:D:60:HIS:CG	2.71	0.43
1:F:219:LYS:HB3	1:F:444:ILE:HD11	1.99	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:81:HIS:CE1	1:B:84:ARG:CD	3.02	0.43
1:D:107:ILE:HD12	1:D:107:ILE:HA	1.92	0.43
1:E:122:ARG:CZ	2:E:1001:ATP:O1B	2.67	0.43
1:B:105:SER:HB2	1:B:109:ARG:CZ	2.48	0.42
1:D:409:THR:HG22	1:D:410:ALA:N	2.34	0.42
1:E:74:GLN:C	1:E:76:GLY:H	2.22	0.42
1:E:236:ALA:HB1	1:E:263:VAL:HG21	2.00	0.42
1:A:93:SER:HB2	1:A:325:GLN:HA	2.01	0.42
1:A:338:LYS:HD3	1:A:405:ILE:HD11	2.01	0.42
1:D:59:GLN:HA	1:D:60:HIS:HA	1.77	0.42
1:B:234:HIS:CE1	1:B:407:GLY:O	2.72	0.42
1:E:236:ALA:CB	1:E:263:VAL:HG21	2.49	0.42
1:A:63:ALA:O	1:A:66:ARG:HB3	2.19	0.42
1:C:453:ALA:HA	1:C:456:GLN:HE21	1.83	0.42
1:C:74:GLN:HA	1:C:77:LEU:HD11	2.01	0.42
1:E:351:MET:HB2	1:E:370:LEU:HD22	2.01	0.42
1:C:228:GLY:HA2	1:C:297:PHE:CD2	2.54	0.42
1:C:367:THR:HG21	1:C:428:SER:HB3	2.01	0.42
1:A:265:ARG:HA	1:D:51:PHE:O	2.19	0.42
1:D:154:ILE:HD13	1:D:164:ASP:HA	2.02	0.42
1:C:239:LEU:HA	1:C:239:LEU:HD13	1.76	0.42
1:C:338:LYS:HE3	1:C:346:THR:OG1	2.19	0.42
1:D:338:LYS:HE3	1:D:338:LYS:HB3	1.85	0.42
1:F:212:GLY:C	1:F:341:ARG:HE	2.22	0.42
1:C:55:THR:HG1	1:F:47:SER:N	2.18	0.42
1:E:156:GLU:O	1:E:156:GLU:HG3	2.20	0.42
1:E:244:GLN:O	1:E:263:VAL:HG23	2.20	0.42
1:F:406:TRP:CZ2	1:F:408:GLY:HA3	2.54	0.42
1:B:191:LYS:HB3	1:B:196:ASP:HB2	2.02	0.42
1:C:238:ASP:OD1	1:C:239:LEU:N	2.52	0.42
1:A:228:GLY:HA2	1:A:297:PHE:CD2	2.54	0.41
1:A:351:MET:HB2	1:A:370:LEU:HD22	2.02	0.41
1:B:93:SER:HB2	1:B:325:GLN:HA	2.02	0.41
1:B:207:SER:HB3	1:B:246:MET:HE1	2.01	0.41
1:A:113:LEU:HD11	1:A:137:ALA:HB2	2.01	0.41
1:A:451:GLN:O	1:A:454:VAL:HG12	2.20	0.41
1:B:52:LEU:HD23	1:B:52:LEU:HA	1.86	0.41
1:C:109:ARG:HH12	1:C:358:ASN:ND2	2.17	0.41
1:D:104:HIS:HB3	1:D:107:ILE:HG22	2.02	0.41
1:C:403:GLY:HA2	1:C:432:LEU:HB2	2.02	0.41
1:E:81:HIS:CD2	1:E:82:PRO:HD3	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:233:HIS:HA	1:E:293:ALA:HB2	2.02	0.41
1:C:361:LYS:HD2	1:F:241:TYR:CZ	2.55	0.41
1:E:367:THR:CG2	1:E:428:SER:HB3	2.47	0.41
1:F:338:LYS:HD3	1:F:405:ILE:CD1	2.50	0.41
1:F:388:LEU:HD23	1:F:404:ILE:HG22	2.01	0.41
1:B:232:ASN:ND2	1:B:385:SER:HB2	2.27	0.41
1:B:213:THR:OG1	1:B:341:ARG:HG2	2.20	0.41
1:C:52:LEU:HD23	1:C:52:LEU:HA	1.93	0.41
1:C:376:ARG:HD2	1:C:421:HIS:NE2	2.36	0.41
1:F:89:GLN:O	1:F:161:VAL:HA	2.21	0.41
1:A:239:LEU:HA	1:A:239:LEU:HD12	1.75	0.41
1:D:338:LYS:HG2	1:D:339:VAL:N	2.35	0.41
1:F:233:HIS:CE1	1:F:291:ASP:CG	2.94	0.41
1:E:246:MET:HG3	1:E:295:ILE:HG12	2.02	0.41
1:B:233:HIS:NE2	1:B:234:HIS:CD2	2.89	0.41
1:C:109:ARG:HH22	1:C:358:ASN:ND2	2.19	0.41
1:A:416:LYS:HE3	1:A:416:LYS:HB3	1.95	0.41
1:B:120:ARG:NH2	1:B:164:ASP:HB3	2.33	0.41
1:C:102:ALA:HA	1:C:105:SER:OG	2.21	0.41
1:C:231:THR:O	1:C:293:ALA:N	2.54	0.40
1:E:80:ARG:HA	1:E:81:HIS:HA	1.53	0.40
1:E:323:ASP:HB3	1:E:326:CYS:SG	2.61	0.40
1:B:219:LYS:HB3	1:B:444:ILE:HD11	2.03	0.40
1:C:156:GLU:O	1:C:156:GLU:HG3	2.21	0.40
1:C:233:HIS:O	1:C:237:VAL:N	2.54	0.40
1:E:87:LYS:HD3	1:E:87:LYS:O	2.21	0.40
1:F:376:ARG:HD2	1:F:421:HIS:CG	2.56	0.40
1:B:134:VAL:HG21	1:B:151:LEU:HD22	2.02	0.40
1:D:266:ALA:HA	1:D:292:GLY:O	2.22	0.40
1:A:62:ALA:O	1:A:279:TYR:HE1	2.04	0.40
1:A:156:GLU:HG3	1:A:156:GLU:O	2.22	0.40
1:A:338:LYS:HE3	1:A:346:THR:OG1	2.21	0.40
1:B:105:SER:CB	1:B:109:ARG:HH22	2.34	0.40

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	397/413 (96%)	391 (98%)	6 (2%)	0	100	100
1	B	398/413 (96%)	394 (99%)	4 (1%)	0	100	100
1	C	398/413 (96%)	393 (99%)	5 (1%)	0	100	100
1	D	398/413 (96%)	397 (100%)	1 (0%)	0	100	100
1	E	398/413 (96%)	391 (98%)	7 (2%)	0	100	100
1	F	398/413 (96%)	393 (99%)	5 (1%)	0	100	100
All	All	2387/2478 (96%)	2359 (99%)	28 (1%)	0	100	100

There are no Ramachandran outliers to report.

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	333/342 (97%)	326 (98%)	7 (2%)	48	70
1	B	334/342 (98%)	329 (98%)	5 (2%)	60	78
1	C	334/342 (98%)	332 (99%)	2 (1%)	84	91
1	D	334/342 (98%)	331 (99%)	3 (1%)	75	86
1	E	334/342 (98%)	329 (98%)	5 (2%)	60	78
1	F	334/342 (98%)	331 (99%)	3 (1%)	75	86
All	All	2003/2052 (98%)	1978 (99%)	25 (1%)	67	82

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	99	THR
1	A	164	ASP
1	A	227	VAL
1	A	265	ARG
1	A	363	ILE
1	A	377	GLN
1	A	409	THR
1	B	68	ASN
1	B	164	ASP
1	B	237	VAL
1	B	243	ASN
1	B	304	SER
1	C	78	LEU
1	C	227	VAL
1	D	164	ASP
1	D	321	VAL
1	D	358	ASN
1	E	164	ASP
1	E	192	LEU
1	E	232	ASN
1	E	235	VAL
1	E	241	TYR
1	F	164	ASP
1	F	187	GLU
1	F	291	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	89	GLN
1	A	208	HIS
1	B	59	GLN
1	B	232	ASN
1	B	234	HIS
1	C	233	HIS
1	C	358	ASN
1	C	456	GLN
1	D	60	HIS
1	D	72	ASN
1	E	59	GLN
1	E	234	HIS

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Mol	Chain	Res	Type
1	E	456	GLN
1	F	89	GLN
1	F	232	ASN
1	F	234	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 12 ligands modelled in this entry, 6 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	ATP	A	1001	3	26,33,33	0.92	1 (3%)	31,52,52	1.40	5 (16%)
2	ATP	E	1001	3	26,33,33	0.91	1 (3%)	31,52,52	1.52	8 (25%)
2	ATP	F	1001	3	26,33,33	0.96	1 (3%)	31,52,52	1.42	5 (16%)
2	ATP	C	1001	3	26,33,33	0.90	1 (3%)	31,52,52	1.44	5 (16%)
2	ATP	B	1001	3	26,33,33	0.93	1 (3%)	31,52,52	1.44	5 (16%)
2	ATP	D	1001	3	26,33,33	0.95	1 (3%)	31,52,52	1.45	5 (16%)

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
2	ATP	A	1001	3	-	2/18/38/38	0/3/3/3
2	ATP	E	1001	3	-	2/18/38/38	0/3/3/3
2	ATP	F	1001	3	-	2/18/38/38	0/3/3/3
2	ATP	C	1001	3	-	2/18/38/38	0/3/3/3
2	ATP	B	1001	3	-	2/18/38/38	0/3/3/3
2	ATP	D	1001	3	-	2/18/38/38	0/3/3/3

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	1001	ATP	C5-C4	2.57	1.47	1.40
2	F	1001	ATP	C5-C4	2.54	1.47	1.40
2	A	1001	ATP	C5-C4	2.52	1.47	1.40
2	E	1001	ATP	C5-C4	2.44	1.47	1.40
2	B	1001	ATP	C5-C4	2.44	1.47	1.40
2	C	1001	ATP	C5-C4	2.42	1.47	1.40

All (33) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	1001	ATP	PA-O3A-PB	-3.26	121.63	132.83
2	C	1001	ATP	PA-O3A-PB	-3.24	121.70	132.83
2	B	1001	ATP	C4-C5-N7	-3.23	106.04	109.40
2	A	1001	ATP	N3-C2-N1	-3.18	123.72	128.68
2	C	1001	ATP	N3-C2-N1	-3.16	123.73	128.68
2	F	1001	ATP	C4-C5-N7	-3.14	106.13	109.40
2	D	1001	ATP	N3-C2-N1	-3.05	123.92	128.68
2	E	1001	ATP	N3-C2-N1	-3.02	123.96	128.68
2	B	1001	ATP	N3-C2-N1	-3.01	123.98	128.68
2	D	1001	ATP	PB-O3B-PG	-2.93	122.79	132.83
2	D	1001	ATP	C3'-C2'-C1'	2.92	105.38	100.98
2	F	1001	ATP	PA-O3A-PB	-2.88	122.96	132.83
2	C	1001	ATP	C3'-C2'-C1'	2.87	105.30	100.98
2	F	1001	ATP	N3-C2-N1	-2.87	124.20	128.68
2	A	1001	ATP	PB-O3B-PG	-2.85	123.03	132.83
2	A	1001	ATP	C3'-C2'-C1'	2.83	105.23	100.98
2	C	1001	ATP	C4-C5-N7	-2.81	106.47	109.40
2	B	1001	ATP	PB-O3B-PG	-2.80	123.22	132.83

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	E	1001	ATP	O2B-PB-O1B	2.80	126.06	112.24
2	B	1001	ATP	C3'-C2'-C1'	2.79	105.18	100.98
2	A	1001	ATP	PA-O3A-PB	-2.78	123.28	132.83
2	E	1001	ATP	C4-C5-N7	-2.77	106.51	109.40
2	F	1001	ATP	C3'-C2'-C1'	2.73	105.09	100.98
2	C	1001	ATP	PB-O3B-PG	-2.72	123.51	132.83
2	F	1001	ATP	PB-O3B-PG	-2.70	123.55	132.83
2	B	1001	ATP	PA-O3A-PB	-2.69	123.60	132.83
2	E	1001	ATP	C3'-C2'-C1'	2.64	104.95	100.98
2	E	1001	ATP	PA-O3A-PB	-2.53	124.15	132.83
2	A	1001	ATP	C4-C5-N7	-2.49	106.81	109.40
2	D	1001	ATP	C4-C5-N7	-2.42	106.88	109.40
2	E	1001	ATP	O3G-PG-O2G	2.30	116.42	107.64
2	E	1001	ATP	PB-O3B-PG	-2.22	125.21	132.83
2	E	1001	ATP	O3B-PG-O1G	-2.03	99.91	111.19

There are no chirality outliers.

All (12) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1001	ATP	PA-O3A-PB-O2B
2	C	1001	ATP	PA-O3A-PB-O2B
2	D	1001	ATP	PA-O3A-PB-O2B
2	E	1001	ATP	PA-O3A-PB-O2B
2	B	1001	ATP	PA-O3A-PB-O2B
2	F	1001	ATP	PA-O3A-PB-O2B
2	A	1001	ATP	PA-O3A-PB-O1B
2	B	1001	ATP	PA-O3A-PB-O1B
2	C	1001	ATP	PA-O3A-PB-O1B
2	D	1001	ATP	PA-O3A-PB-O1B
2	E	1001	ATP	PA-O3A-PB-O1B
2	F	1001	ATP	PA-O3A-PB-O1B

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	1001	ATP	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In

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

Ligand ATP A 1001

Ligand ATP E 1001

Ligand ATP F 1001

Bond lengths

Bond angles

Torsions

Rings

Ligand ATP C 1001

Bond lengths

Bond angles

Torsions

Rings

Ligand ATP B 1001

Bond lengths

Bond angles

Torsions

Rings

Ligand ATP D 1001

Bond lengths

Bond angles

Torsions

Rings
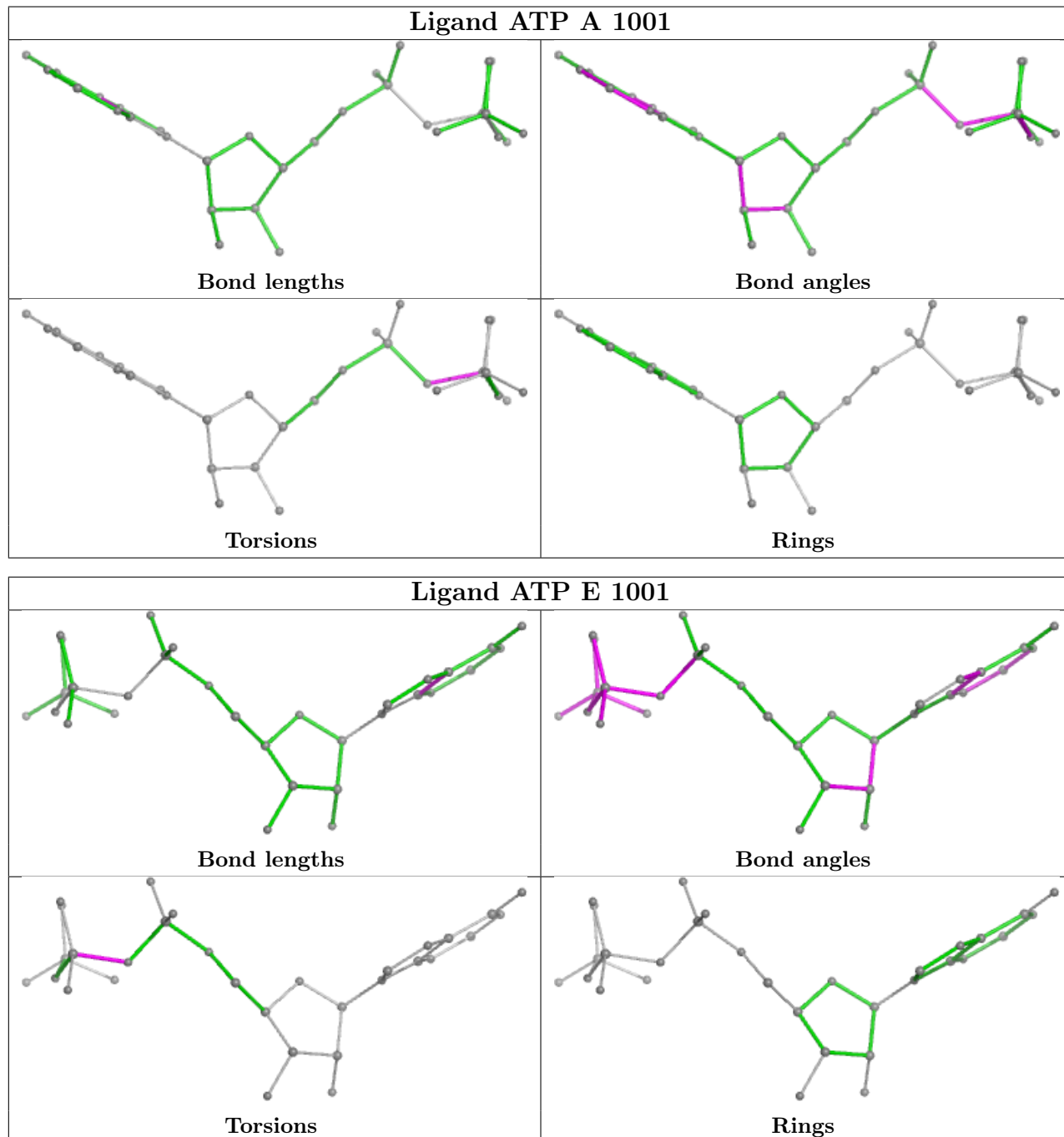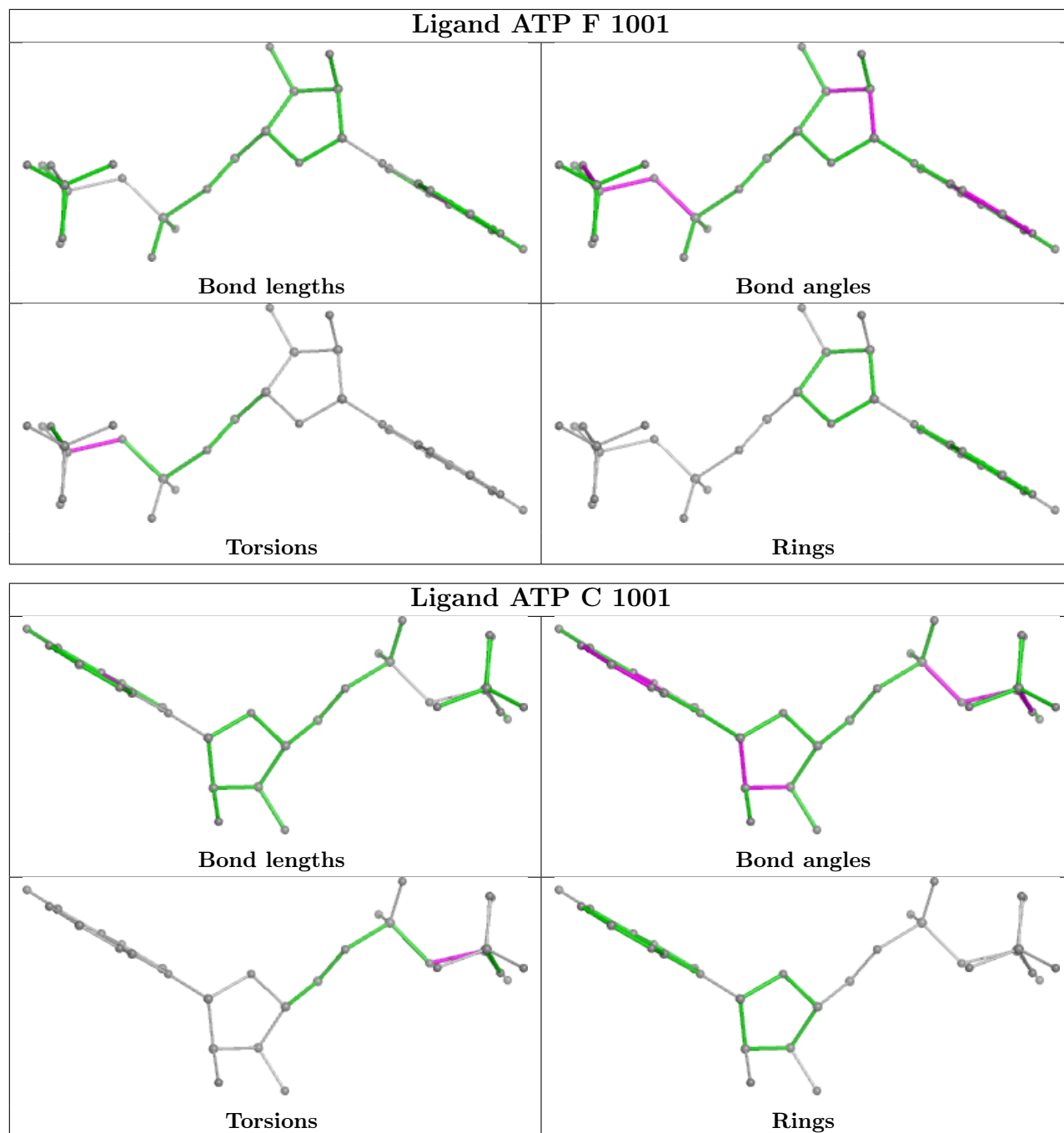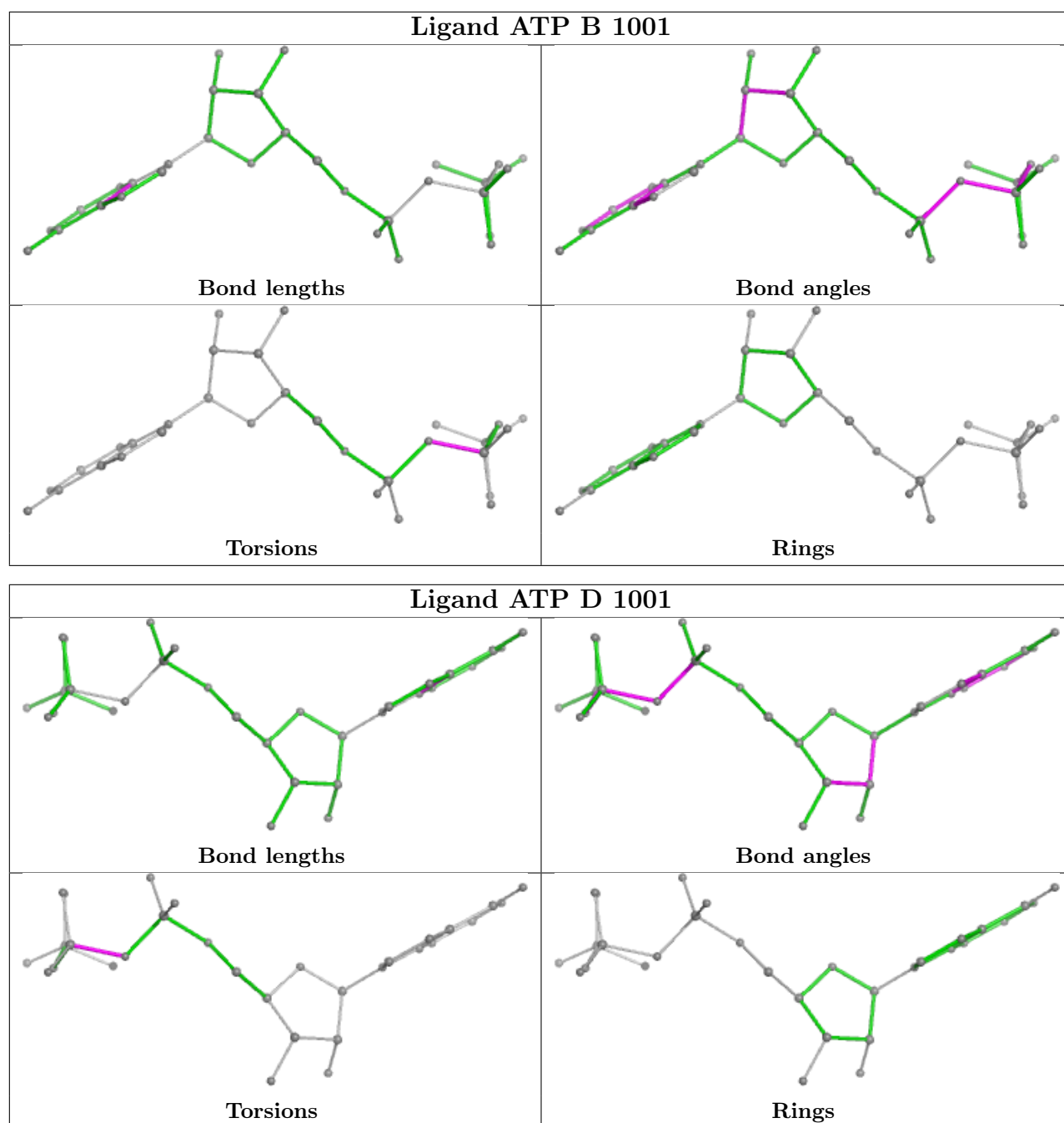
5.7 Other polymers ⓘ

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(Å²)	Q<0.9
1	A	401/413 (97%)	-0.30	4 (0%)	79	77	38, 64, 116, 191	0
1	B	402/413 (97%)	-0.40	4 (0%)	79	77	37, 60, 106, 160	0
1	C	402/413 (97%)	-0.26	6 (1%)	71	69	38, 68, 116, 157	0
1	D	402/413 (97%)	-0.31	7 (1%)	69	66	39, 63, 114, 188	0
1	E	402/413 (97%)	-0.26	10 (2%)	58	56	43, 68, 120, 189	0
1	F	402/413 (97%)	-0.43	4 (0%)	79	77	36, 59, 104, 150	0
All	All	2411/2478 (97%)	-0.33	35 (1%)	71	69	36, 63, 115, 191	0

All (35) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	236	ALA	4.3
1	B	78	LEU	4.0
1	C	236	ALA	3.8
1	D	241	TYR	3.7
1	C	237	VAL	3.4
1	E	237	VAL	3.4
1	C	78	LEU	3.1
1	B	79	PRO	3.1
1	B	237	VAL	3.0
1	E	79	PRO	2.9
1	C	411	ASN	2.8
1	F	56	SER	2.8
1	A	78	LEU	2.8
1	B	58	LEU	2.7
1	A	79	PRO	2.7
1	A	412	ARG	2.7
1	F	237	VAL	2.6
1	E	234	HIS	2.6
1	E	82	PRO	2.4

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Mol	Chain	Res	Type	RSRZ
1	D	82	PRO	2.4
1	D	183	GLN	2.3
1	E	233	HIS	2.3
1	D	239	LEU	2.3
1	D	56	SER	2.3
1	E	58	LEU	2.3
1	F	240	ASP	2.2
1	E	77	LEU	2.2
1	D	238	ASP	2.2
1	A	233	HIS	2.2
1	E	78	LEU	2.1
1	E	62	ALA	2.1
1	C	412	ARG	2.1
1	D	85	LEU	2.0
1	F	58	LEU	2.0
1	C	82	PRO	2.0

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 monosaccharides 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, 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	ATP	B	1001	31/31	0.95	0.07	41,51,64,84	0
2	ATP	C	1001	31/31	0.95	0.07	51,65,77,87	0
2	ATP	F	1001	31/31	0.95	0.07	44,53,65,72	0
2	ATP	E	1001	31/31	0.96	0.07	48,63,73,89	0
2	ATP	A	1001	31/31	0.96	0.07	39,50,67,75	0
2	ATP	D	1001	31/31	0.97	0.06	40,51,64,69	0
3	MG	A	1002	1/1	0.98	0.10	55,55,55,55	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	MG	C	1002	1/1	0.98	0.06	49,49,49,49	0
3	MG	B	1002	1/1	0.99	0.08	48,48,48,48	0
3	MG	D	1002	1/1	0.99	0.09	48,48,48,48	0
3	MG	E	1002	1/1	0.99	0.05	54,54,54,54	0
3	MG	F	1002	1/1	0.99	0.07	49,49,49,49	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.

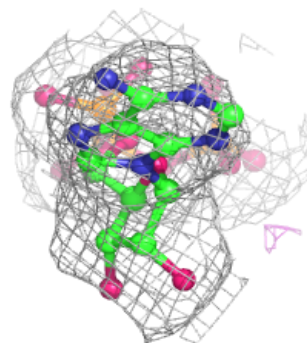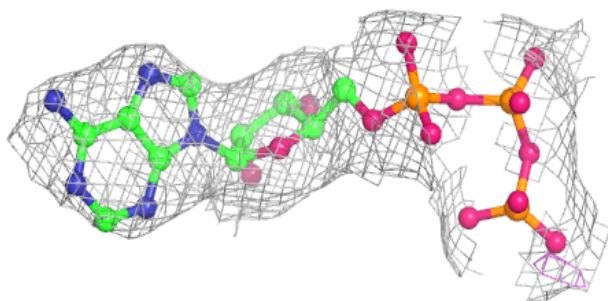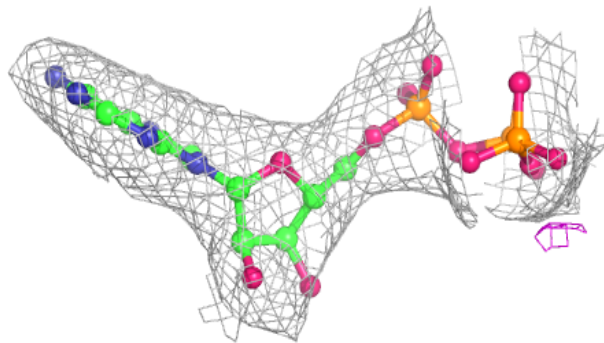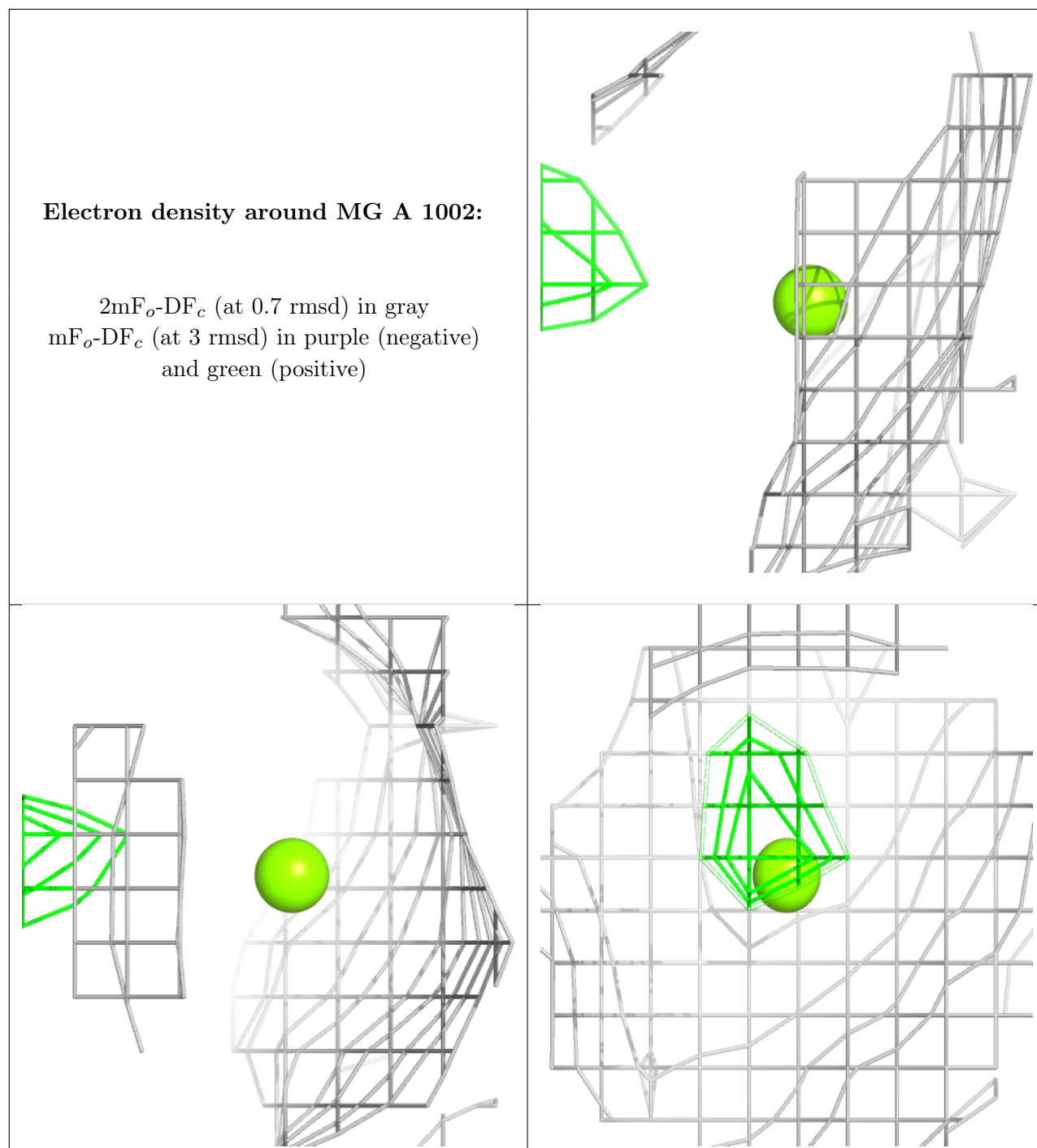Electron density around ATP B 1001:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative) and green (positive)
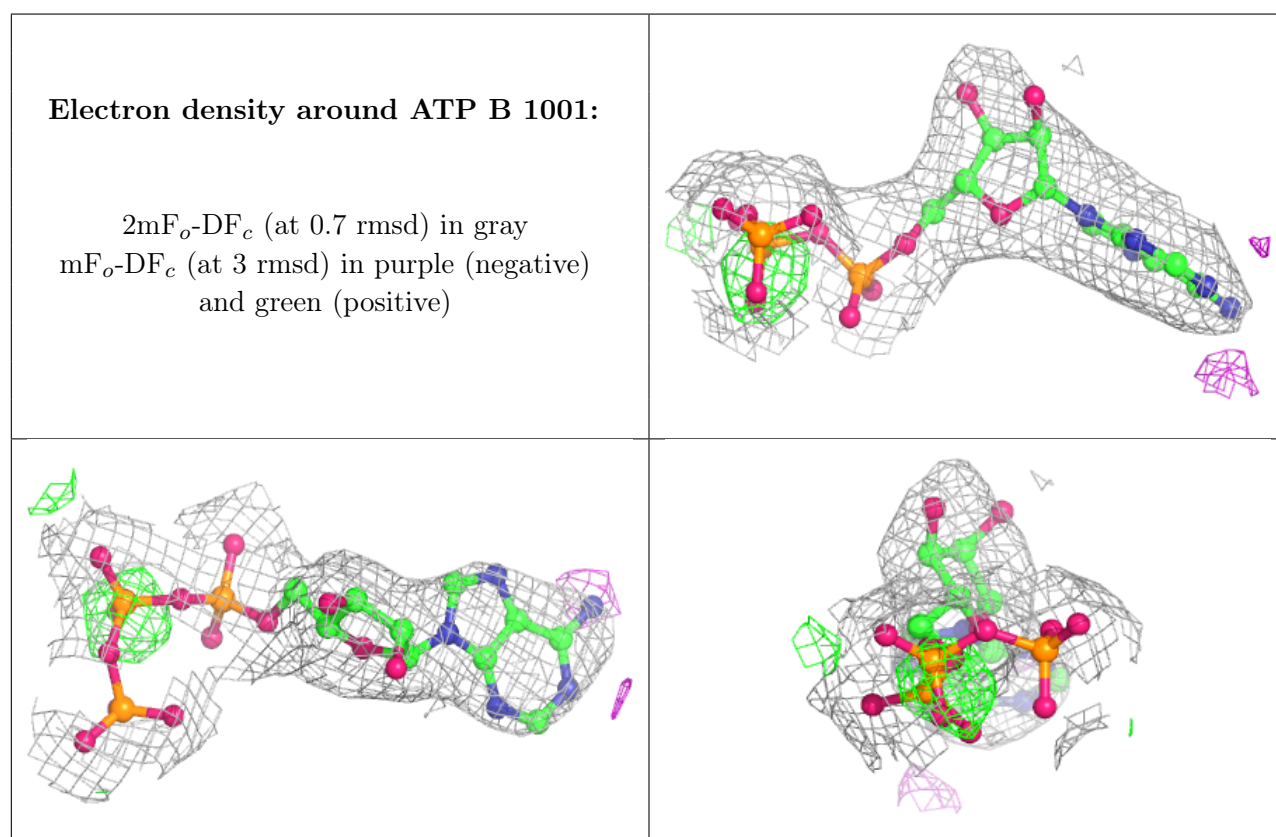
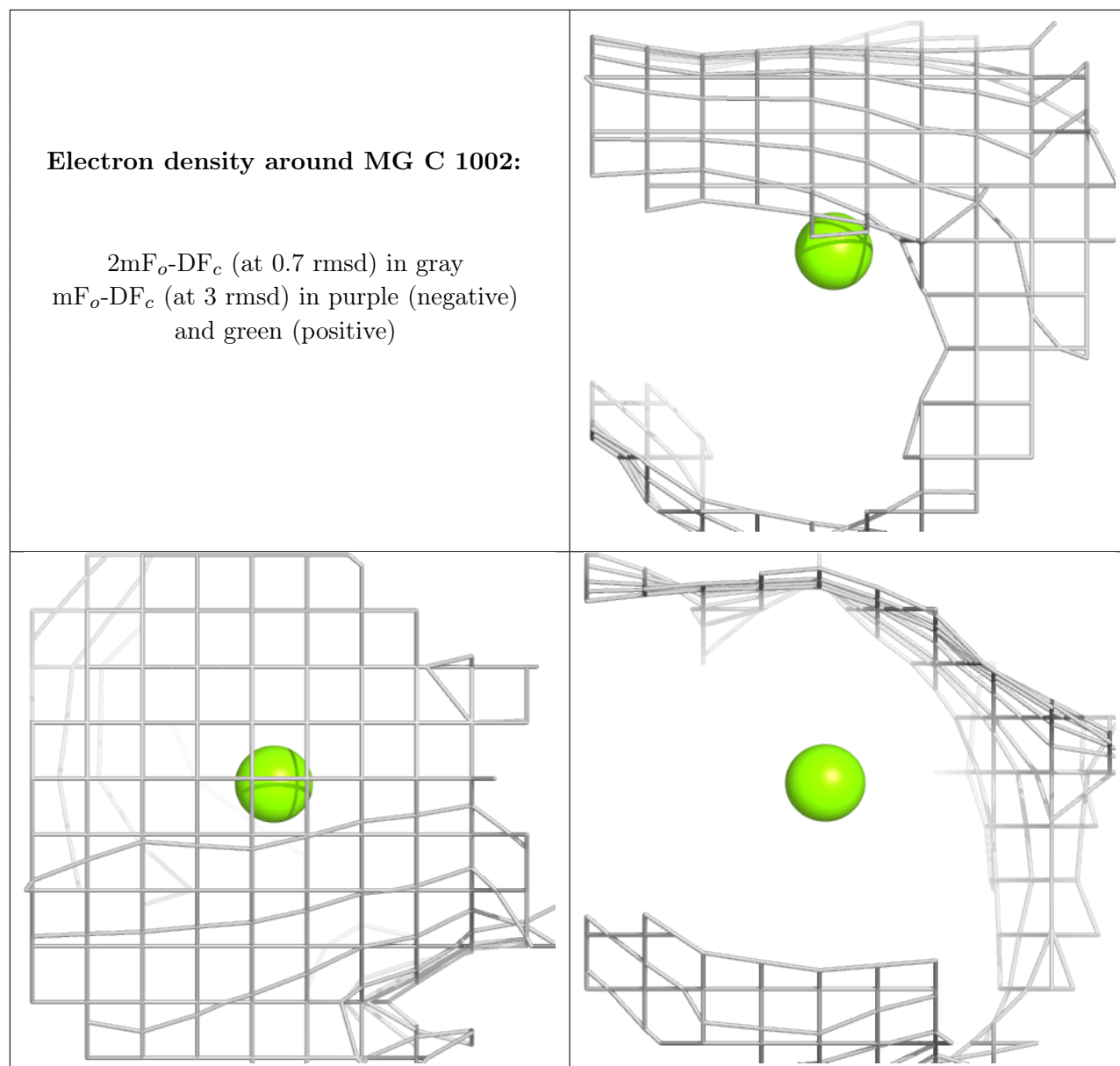**Electron density around ATP C 1001:**

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
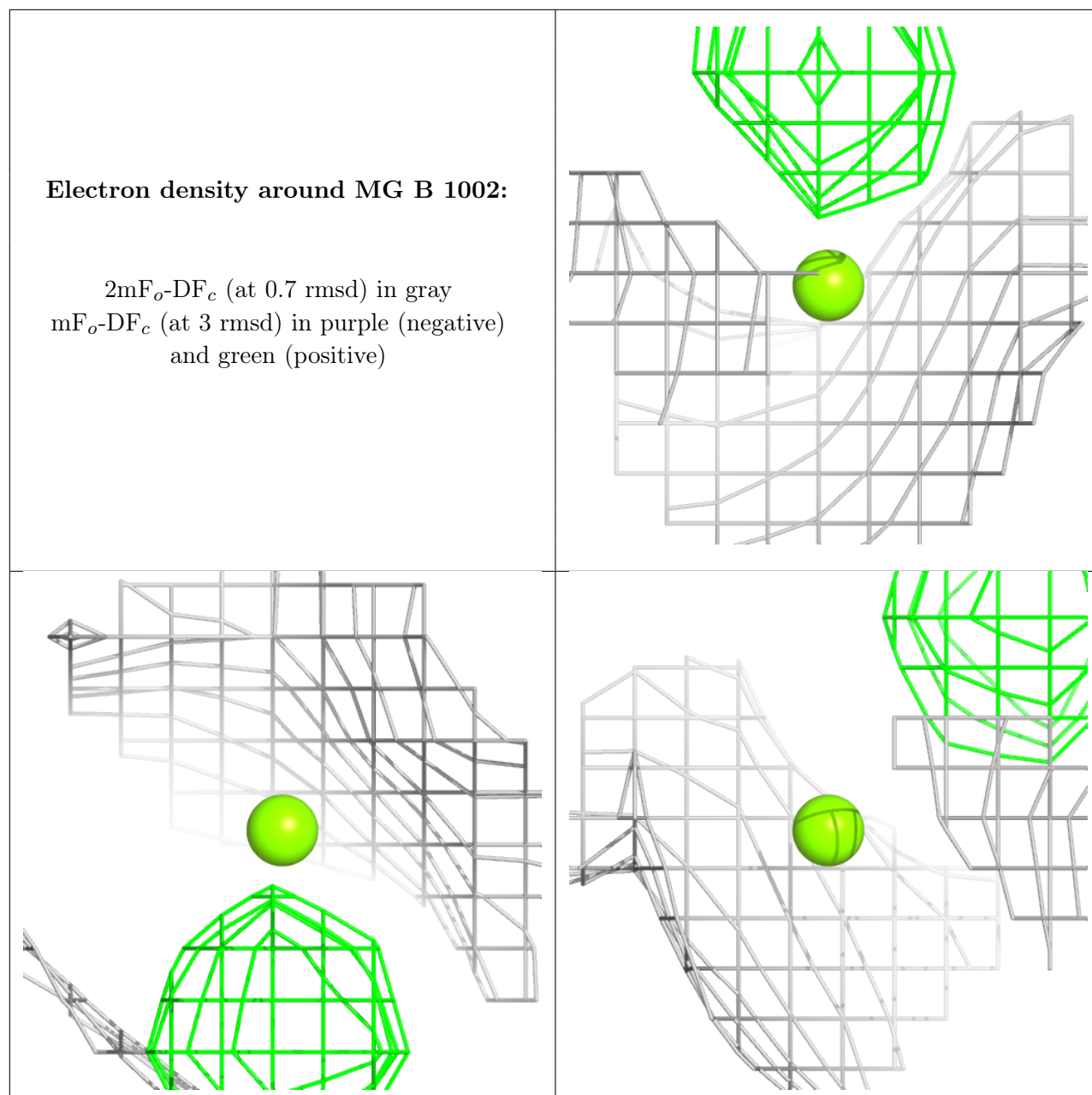and green (positive)
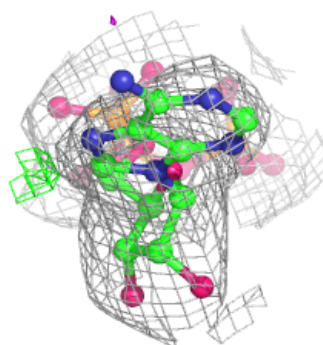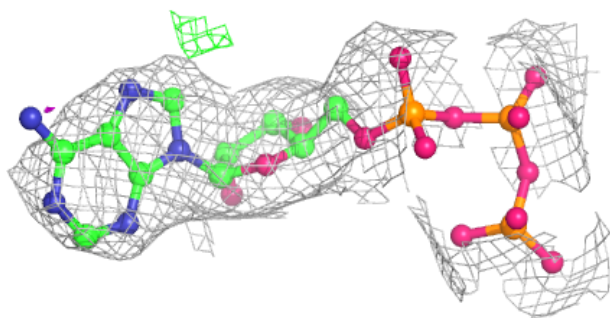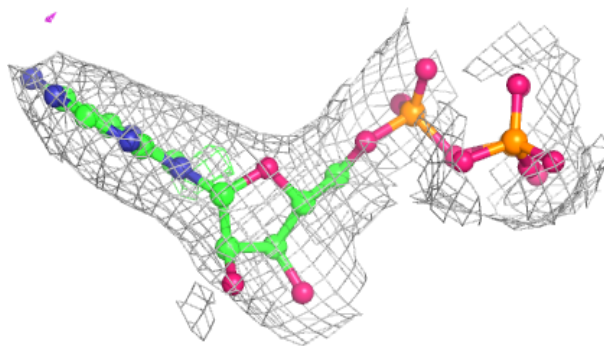
Electron density around ATP F 1001:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
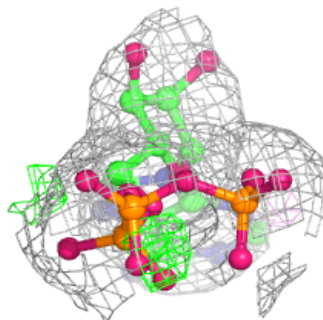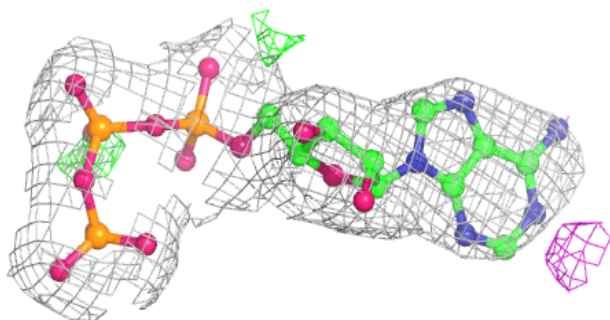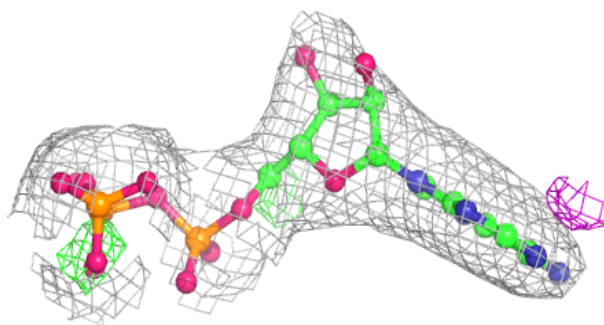
Electron density around ATP E 1001:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
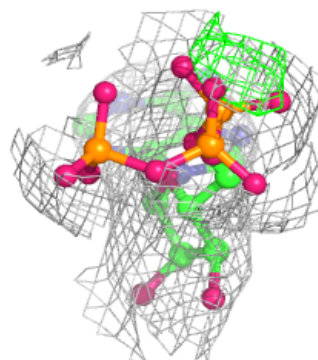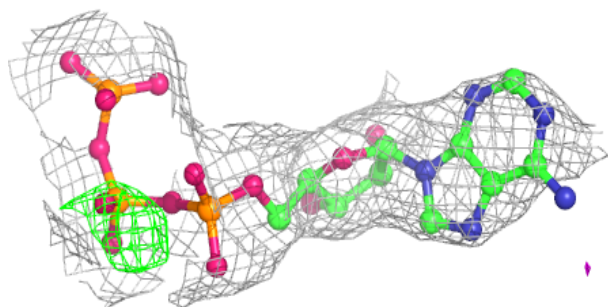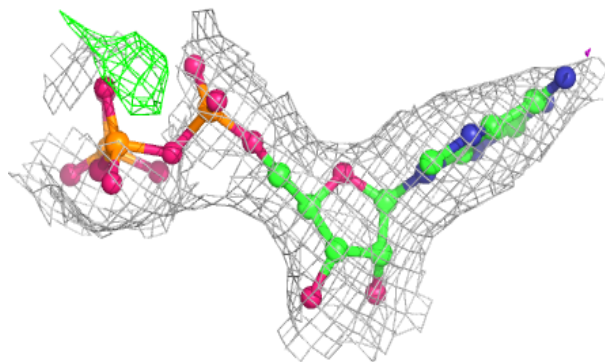
Electron density around ATP A 1001:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
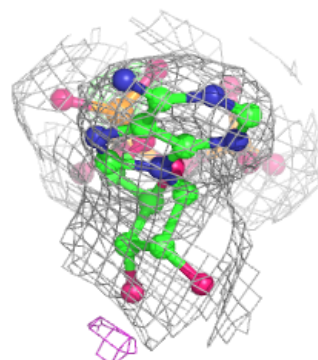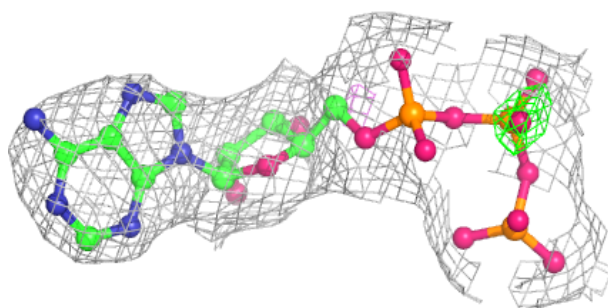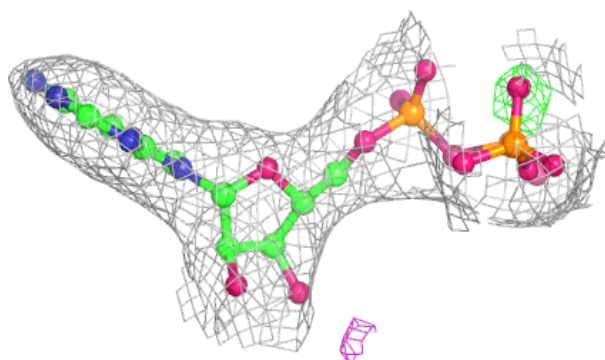
Electron density around ATP D 1001:

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

Electron density around MG A 1002:

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

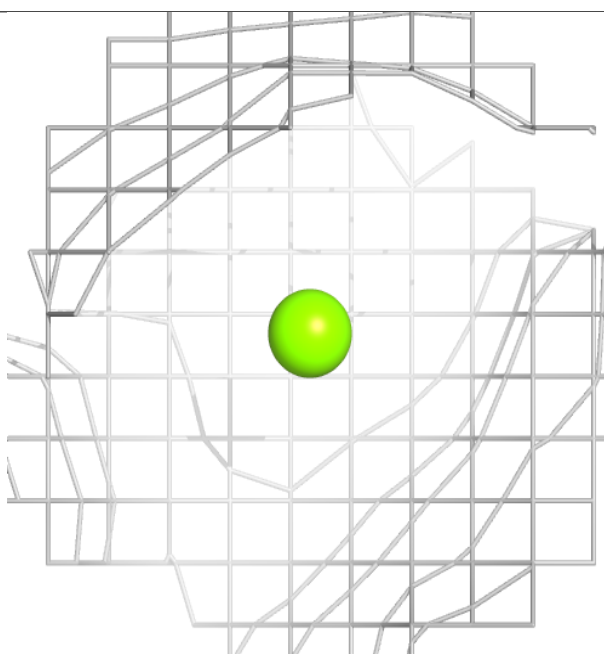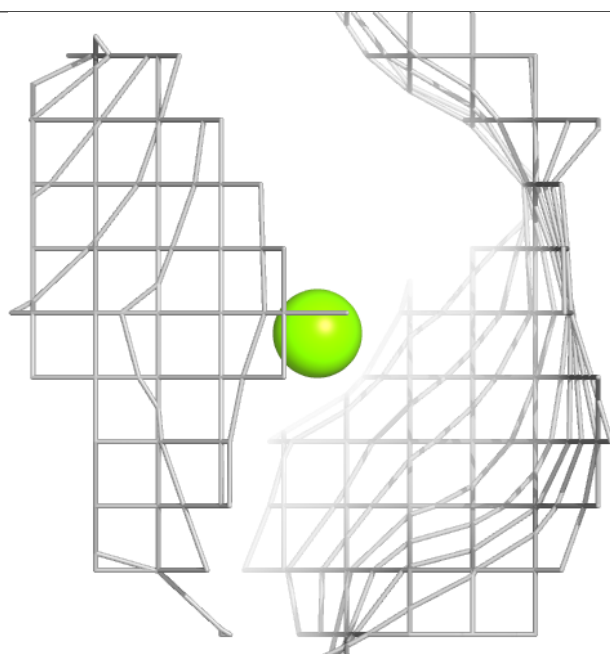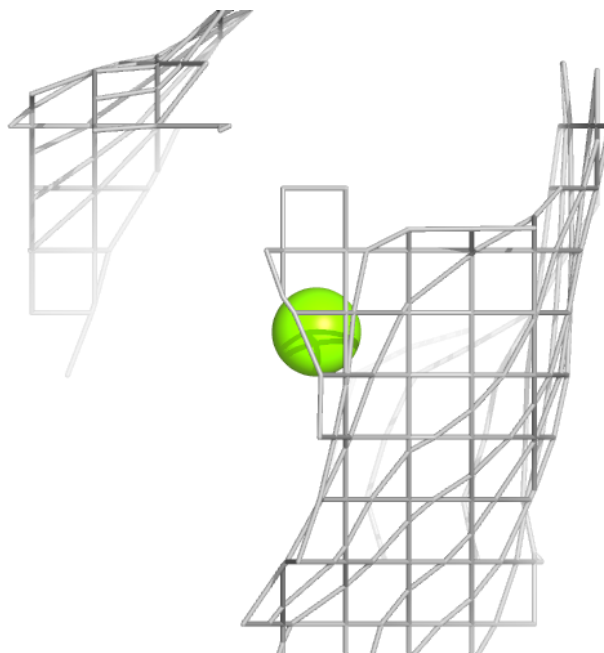**Electron density around MG C 1002:**

$2mF_o$-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 1002:

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

Electron density around MG D 1002:

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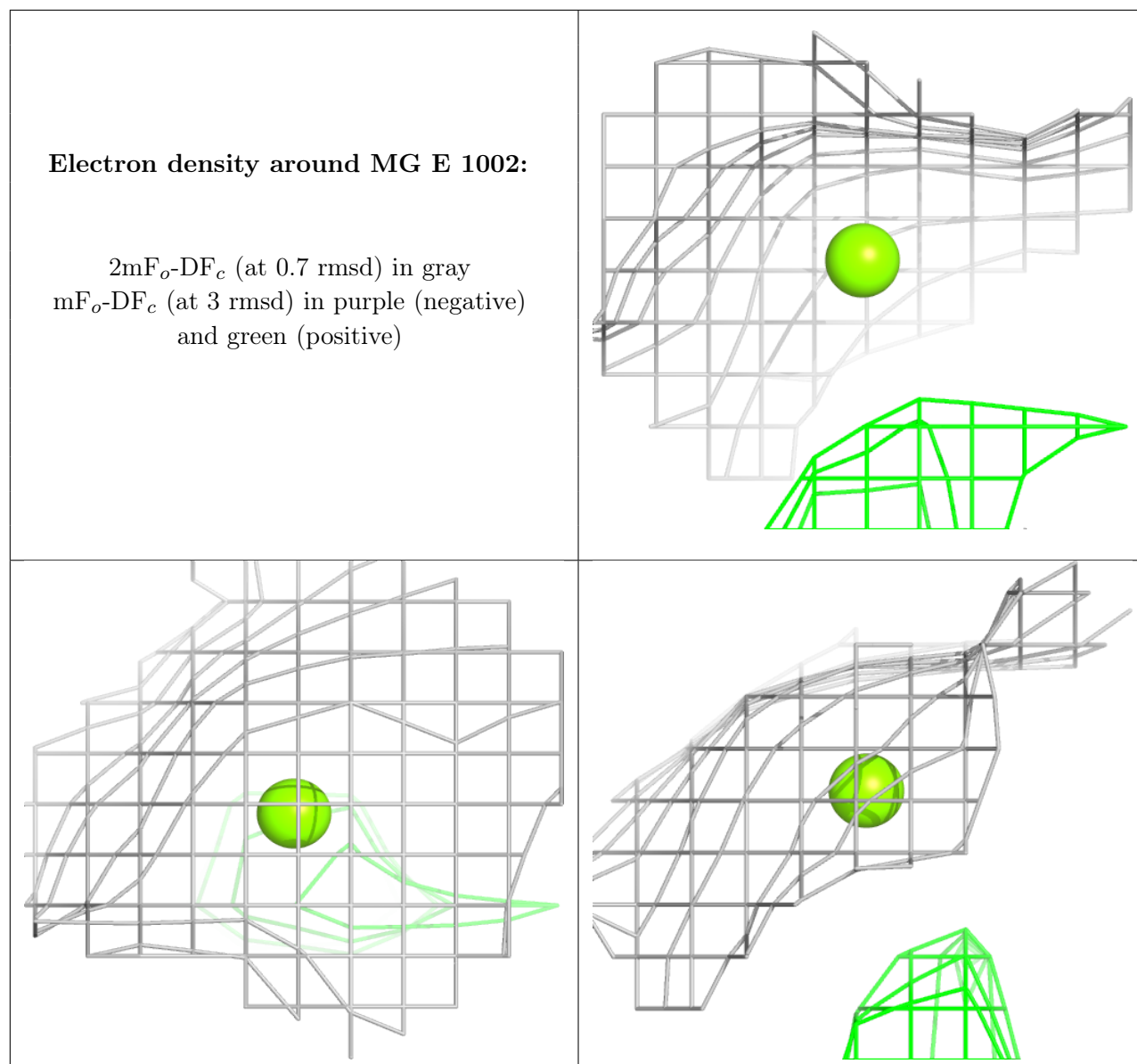mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around MG E 1002:

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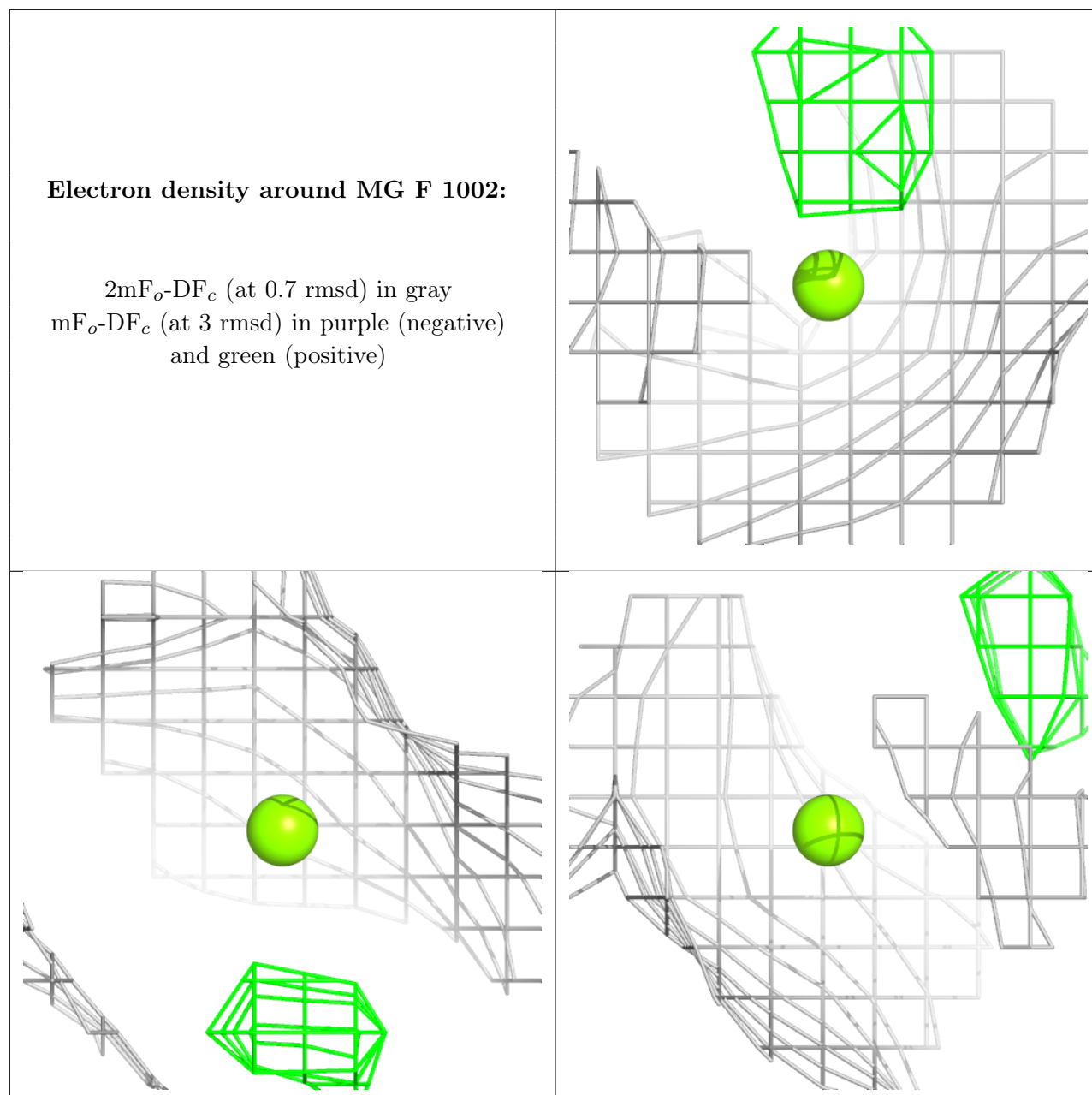and green (positive)

Electron density around MG F 1002:

$2mF_o$-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 ⓘ

There are no such residues in this entry.