



wwPDB X-ray Structure Validation Summary Report

Mar 24, 2022 – 04:11 pm GMT

PDB ID : 6HT7
Title : Crystal structure of the WT human mitochondrial chaperonin (ADP:BeF3)₁₄ complex
Authors : Jebara, F.; Patra, M.; Azem, A.; Hirsch, J.
Deposited on : 2018-10-03
Resolution : 3.70 Å (reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

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

with specific help available everywhere you see the  symbol.

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 : 2.27
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0267
CCP4 : 7.1.010 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.27

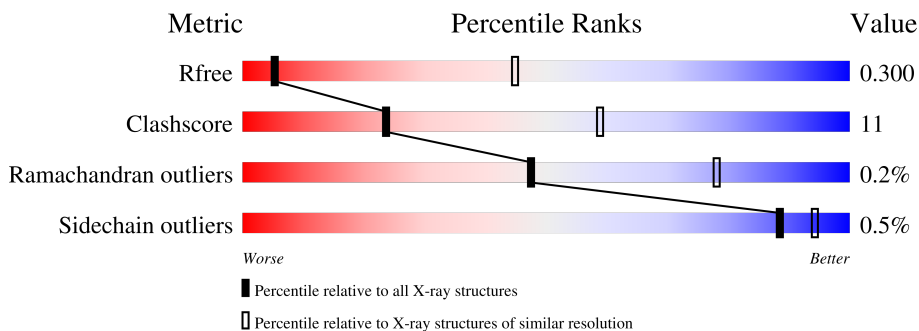
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.70 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}	130704	1049 (3.88-3.52)
Clashscore	141614	1027 (3.86-3.54)
Ramachandran outliers	138981	1069 (3.88-3.52)
Sidechain outliers	138945	1065 (3.88-3.52)

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 $\leq 5\%$.

Mol	Chain	Length	Quality of chain
1	A	549	74% 22% .
1	B	549	70% 26% .
1	C	549	75% 21% .
1	D	549	73% 23% ..
1	E	549	74% 21% ..
1	F	549	71% 25% ..
1	G	549	72% 24% .

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Mol	Chain	Length	Quality of chain	
1	H	549	71%	24%
1	I	549	69%	27%
1	J	549	69%	27%
1	K	549	74%	22%
1	L	549	71%	25%
1	M	549	72%	24%
1	N	549	75%	21%
2	1	102	76%	22%
2	2	102	76%	22%
2	O	102	77%	21%
2	P	102	69%	29%
2	Q	102	73%	25%
2	R	102	74%	25%
2	S	102	76%	22%
2	T	102	72%	26%
2	U	102	70%	28%
2	V	102	82%	16%
2	W	102	75%	23%
2	X	102	77%	21%
2	Y	102	72%	26%
2	Z	102	75%	23%

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	BEF	B	602	-	-	X	-
4	BEF	C	602	-	-	X	-

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Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	BEF	D	602	-	-	X	-
4	BEF	E	602	-	-	X	-
4	BEF	F	602	-	-	X	-
4	BEF	G	602	-	-	X	-
4	BEF	H	602	-	-	X	-
4	BEF	I	602	-	-	X	-
4	BEF	J	602	-	-	X	-
4	BEF	L	602	-	-	X	-
4	BEF	N	602	-	-	X	-

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 134311 atoms, of which 68273 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 60 kDa heat shock protein, mitochondrial.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	J	528	8037	2465	4105	672	781	14	0	0	0
1	I	528	8030	2465	4098	672	781	14	0	0	0
1	H	528	8035	2465	4103	672	781	14	0	0	0
1	N	528	8035	2465	4103	672	781	14	0	0	0
1	M	528	8037	2465	4105	672	781	14	0	0	0
1	L	528	8012	2465	4080	672	781	14	0	0	0
1	K	528	8032	2465	4100	672	781	14	0	0	0
1	G	528	8036	2465	4104	672	781	14	0	0	0
1	F	528	8037	2465	4105	672	781	14	0	0	0
1	E	528	8037	2465	4105	672	781	14	0	0	0
1	D	528	8034	2465	4102	672	781	14	0	0	0
1	C	528	8035	2465	4103	672	781	14	0	0	0
1	B	528	8037	2465	4105	672	781	14	0	0	0
1	A	528	8037	2465	4105	672	781	14	0	0	0

There are 28 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
J	1	GLY	-	expression tag	UNP P10809

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Chain	Residue	Modelled	Actual	Comment	Reference
J	2	SER	-	expression tag	UNP P10809
I	1	GLY	-	expression tag	UNP P10809
I	2	SER	-	expression tag	UNP P10809
H	1	GLY	-	expression tag	UNP P10809
H	2	SER	-	expression tag	UNP P10809
N	1	GLY	-	expression tag	UNP P10809
N	2	SER	-	expression tag	UNP P10809
M	1	GLY	-	expression tag	UNP P10809
M	2	SER	-	expression tag	UNP P10809
L	1	GLY	-	expression tag	UNP P10809
L	2	SER	-	expression tag	UNP P10809
K	1	GLY	-	expression tag	UNP P10809
K	2	SER	-	expression tag	UNP P10809
G	1	GLY	-	expression tag	UNP P10809
G	2	SER	-	expression tag	UNP P10809
F	1	GLY	-	expression tag	UNP P10809
F	2	SER	-	expression tag	UNP P10809
E	1	GLY	-	expression tag	UNP P10809
E	2	SER	-	expression tag	UNP P10809
D	1	GLY	-	expression tag	UNP P10809
D	2	SER	-	expression tag	UNP P10809
C	1	GLY	-	expression tag	UNP P10809
C	2	SER	-	expression tag	UNP P10809
B	1	GLY	-	expression tag	UNP P10809
B	2	SER	-	expression tag	UNP P10809
A	1	GLY	-	expression tag	UNP P10809
A	2	SER	-	expression tag	UNP P10809

- Molecule 2 is a protein called 10 kDa heat shock protein, mitochondrial.

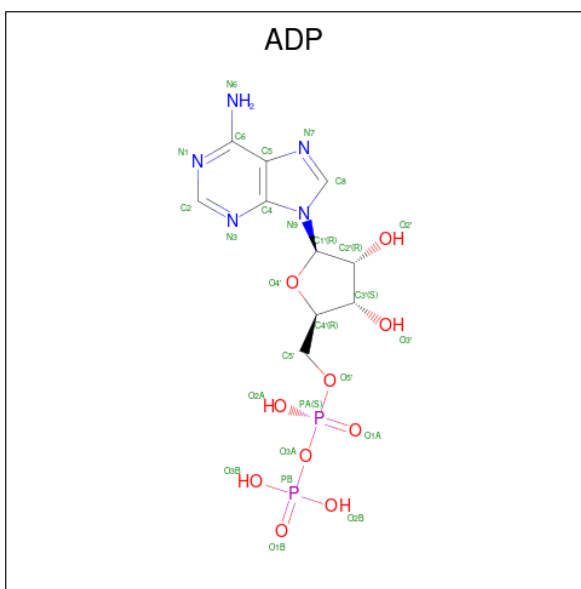
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
2	X	100	Total	C	H	N	O	S	0	0	0
			1527	483	775	126	142	1			
2	W	100	Total	C	H	N	O	S	0	0	0
			1527	483	775	126	142	1			
2	V	100	Total	C	H	N	O	S	0	0	0
			1527	483	775	126	142	1			
2	2	100	Total	C	H	N	O	S	0	0	0
			1527	483	775	126	142	1			
2	1	100	Total	C	H	N	O	S	0	0	0
			1527	483	775	126	142	1			
2	Z	100	Total	C	H	N	O	S	0	0	0
			1527	483	775	126	142	1			

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	H	N	O				S
2	Y	100	Total	C	H	N	O	S	0	0	0
			1527	483	775	126	142	1			
2	U	100	Total	C	H	N	O	S	0	0	0
			1527	483	775	126	142	1			
2	T	100	Total	C	H	N	O	S	0	0	0
			1527	483	775	126	142	1			
2	S	100	Total	C	H	N	O	S	0	0	0
			1527	483	775	126	142	1			
2	R	100	Total	C	H	N	O	S	0	0	0
			1527	483	775	126	142	1			
2	Q	100	Total	C	H	N	O	S	0	0	0
			1527	483	775	126	142	1			
2	P	100	Total	C	H	N	O	S	0	0	0
			1527	483	775	126	142	1			
2	O	100	Total	C	H	N	O	S	0	0	0
			1527	483	775	126	142	1			

- Molecule 3 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).



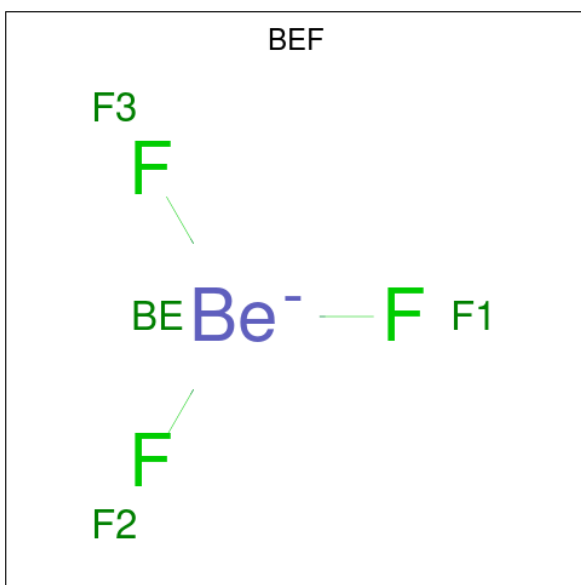
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	N	O			P
3	J	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
3	I	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
3	H	1	Total	C	N	O	P	0	0
			27	10	5	10	2		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
3	N	1	Total 27	C 10	N 5	O 10	P 2	0	0
3	M	1	Total 27	C 10	N 5	O 10	P 2	0	0
3	L	1	Total 27	C 10	N 5	O 10	P 2	0	0
3	K	1	Total 27	C 10	N 5	O 10	P 2	0	0
3	G	1	Total 27	C 10	N 5	O 10	P 2	0	0
3	F	1	Total 27	C 10	N 5	O 10	P 2	0	0
3	E	1	Total 27	C 10	N 5	O 10	P 2	0	0
3	D	1	Total 27	C 10	N 5	O 10	P 2	0	0
3	C	1	Total 27	C 10	N 5	O 10	P 2	0	0
3	B	1	Total 27	C 10	N 5	O 10	P 2	0	0
3	A	1	Total 27	C 10	N 5	O 10	P 2	0	0

- Molecule 4 is BERYLLIUM TRIFLUORIDE ION (three-letter code: BEF) (formula: BeF₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	J	1	Total	Be	F	0	0
			4	1	3		
4	I	1	Total	Be	F	0	0
			4	1	3		
4	H	1	Total	Be	F	0	0
			4	1	3		
4	N	1	Total	Be	F	0	0
			4	1	3		
4	M	1	Total	Be	F	0	0
			4	1	3		
4	L	1	Total	Be	F	0	0
			4	1	3		
4	K	1	Total	Be	F	0	0
			4	1	3		
4	G	1	Total	Be	F	0	0
			4	1	3		
4	F	1	Total	Be	F	0	0
			4	1	3		
4	E	1	Total	Be	F	0	0
			4	1	3		
4	D	1	Total	Be	F	0	0
			4	1	3		
4	C	1	Total	Be	F	0	0
			4	1	3		
4	B	1	Total	Be	F	0	0
			4	1	3		
4	A	1	Total	Be	F	0	0
			4	1	3		

- Molecule 5 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	J	1	Total	Mg	0	0
			1	1		
5	I	1	Total	Mg	0	0
			1	1		
5	H	1	Total	Mg	0	0
			1	1		
5	N	1	Total	Mg	0	0
			1	1		
5	M	1	Total	Mg	0	0
			1	1		
5	L	1	Total	Mg	0	0
			1	1		

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

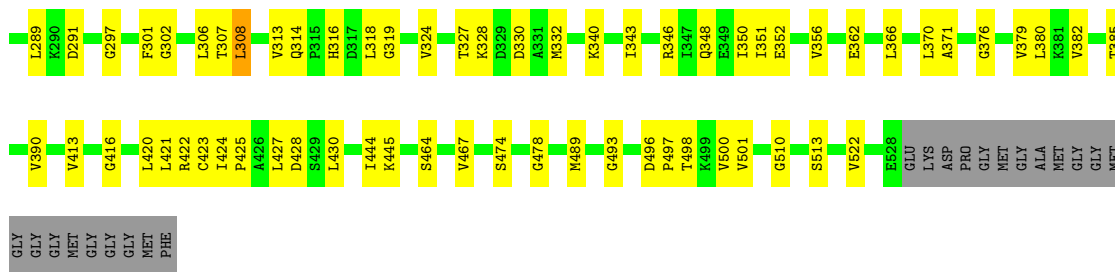
- Molecule 6 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	J	1	Total K 1 1	0	0
6	I	1	Total K 1 1	0	0
6	H	1	Total K 1 1	0	0
6	N	1	Total K 1 1	0	0
6	M	1	Total K 1 1	0	0
6	L	1	Total K 1 1	0	0
6	K	1	Total K 1 1	0	0
6	G	1	Total K 1 1	0	0
6	F	1	Total K 1 1	0	0
6	E	1	Total K 1 1	0	0
6	D	1	Total K 1 1	0	0

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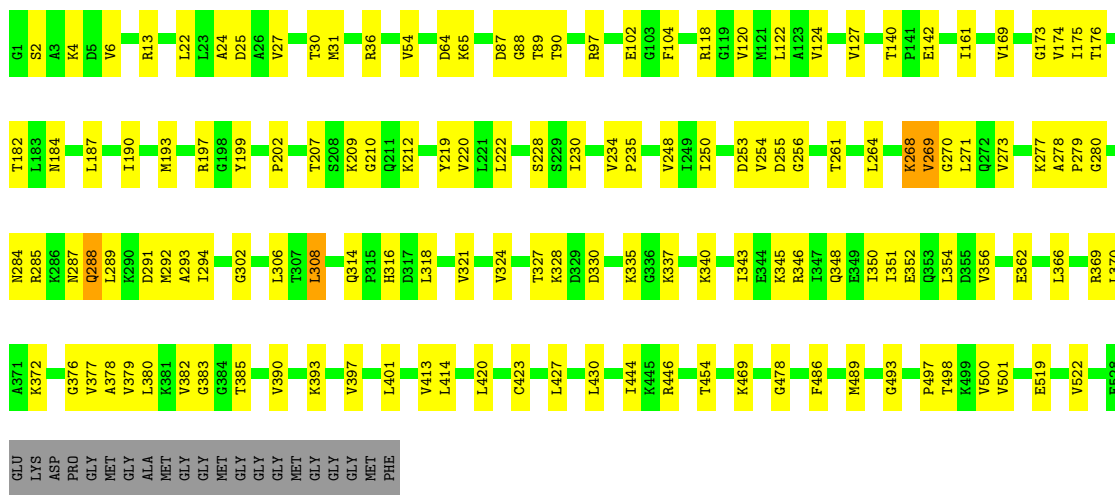
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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	C	1	Total K 1 1	0	0
6	B	1	Total K 1 1	0	0
6	A	1	Total K 1 1	0	0



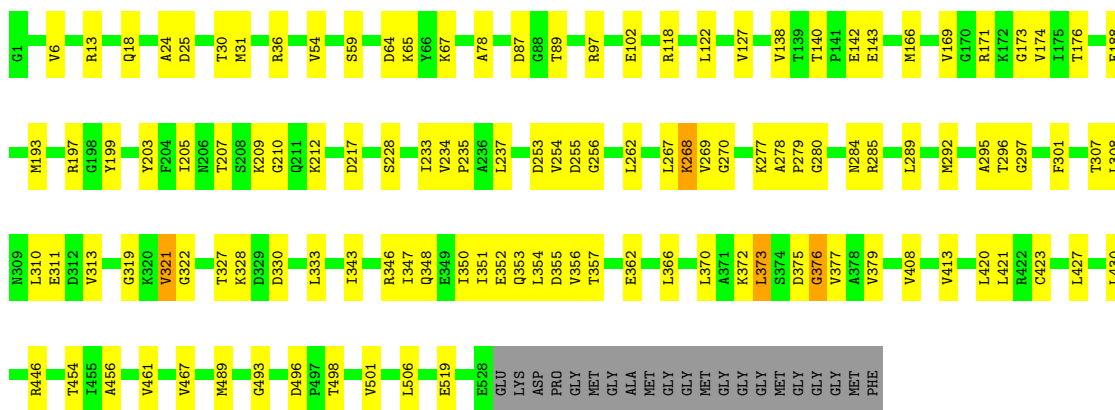
• Molecule 1: 60 kDa heat shock protein, mitochondrial

Chain F: 71% 25%



• Molecule 1: 60 kDa heat shock protein, mitochondrial

Chain E: 74% 21%

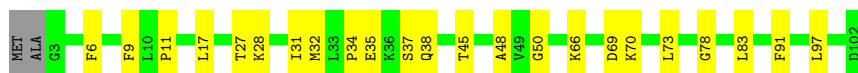


• Molecule 1: 60 kDa heat shock protein, mitochondrial

Chain D: 73% 23%

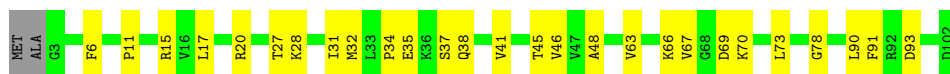


Chain Z:  75% 23%



- Molecule 2: 10 kDa heat shock protein, mitochondrial

Chain Y:  72% 26%



- Molecule 2: 10 kDa heat shock protein, mitochondrial

Chain U:  70% 28%



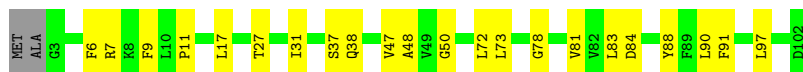
- Molecule 2: 10 kDa heat shock protein, mitochondrial

Chain T:  72% 26%



- Molecule 2: 10 kDa heat shock protein, mitochondrial

Chain S:  76% 22%



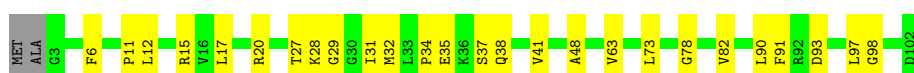
- Molecule 2: 10 kDa heat shock protein, mitochondrial

Chain R:  74% 25%



- Molecule 2: 10 kDa heat shock protein, mitochondrial

Chain Q:  73% 25%




- Molecule 2: 10 kDa heat shock protein, mitochondrial

Chain P:  69% 29%



- Molecule 2: 10 kDa heat shock protein, mitochondrial

Chain O:  77% 21%



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	141.59Å 295.78Å 326.53Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.95 – 3.70 48.95 – 3.70	Depositor EDS
% Data completeness (in resolution range)	98.7 (48.95-3.70) 86.8 (48.95-3.70)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.34 (at 3.67Å)	Xtrriage
Refinement program	PHENIX	Depositor
R, R_{free}	(Not available) , (Not available) 0.265 , 0.300	Depositor DCC
R_{free} test set	2000 reflections (1.38%)	wwPDB-VP
Wilson B-factor (Å ²)	110.0	Xtrriage
Anisotropy	0.504	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	(Not available) , (Not available)	EDS
L-test for twinning ²	$\langle L \rangle = 0.45$, $\langle L^2 \rangle = 0.28$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	134311	wwPDB-VP
Average B, all atoms (Å ²)	161.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 25.75 % 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 2.9942e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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

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	0.35	0/3964	0.53	0/5347
1	B	0.35	0/3964	0.53	0/5347
1	C	0.36	0/3964	0.55	0/5347
1	D	0.34	0/3964	0.53	0/5347
1	E	0.35	0/3964	0.53	0/5347
1	F	0.37	0/3964	0.54	0/5347
1	G	0.37	0/3964	0.55	0/5347
1	H	0.34	0/3964	0.54	1/5347 (0.0%)
1	I	0.36	0/3964	0.55	0/5347
1	J	0.36	0/3964	0.53	0/5347
1	K	0.35	0/3964	0.54	0/5347
1	L	0.37	0/3964	0.56	0/5347
1	M	0.35	0/3964	0.54	0/5347
1	N	0.34	0/3964	0.53	0/5347
2	1	0.32	0/763	0.62	0/1026
2	2	0.32	0/763	0.57	0/1026
2	O	0.34	0/763	0.60	0/1026
2	P	0.33	0/763	0.62	0/1026
2	Q	0.34	0/763	0.64	0/1026
2	R	0.35	0/763	0.61	0/1026
2	S	0.31	0/763	0.58	0/1026
2	T	0.33	0/763	0.61	0/1026
2	U	0.35	0/763	0.60	0/1026
2	V	0.32	0/763	0.58	0/1026
2	W	0.32	0/763	0.61	0/1026
2	X	0.35	0/763	0.60	0/1026
2	Y	0.35	0/763	0.59	0/1026
2	Z	0.32	0/763	0.57	0/1026
All	All	0.35	0/66178	0.55	1/89222 (0.0%)

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	1
1	B	0	1
1	C	0	1
1	D	0	2
1	E	0	2
1	F	0	1
1	G	0	1
1	H	0	1
1	I	0	1
1	J	0	1
1	K	0	1
1	L	0	1
1	M	0	1
1	N	0	1
All	All	0	16

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	H	373	LEU	CA-CB-CG	5.83	128.71	115.30

There are no chirality outliers.

5 of 16 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	H	268	LYS	Peptide
1	I	268	LYS	Peptide
1	J	268	LYS	Peptide
1	M	268	LYS	Peptide
1	N	268	LYS	Peptide

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	3932	4105	4111	81	0
1	B	3932	4105	4110	101	0
1	C	3932	4103	4111	82	0
1	D	3932	4102	4111	86	0
1	E	3932	4105	4111	76	0
1	F	3932	4105	4111	96	1
1	G	3932	4104	4110	103	0
1	H	3932	4103	4111	98	0
1	I	3932	4098	4109	107	0
1	J	3932	4105	4111	105	2
1	K	3932	4100	4111	85	0
1	L	3932	4080	4111	111	0
1	M	3932	4105	4111	93	0
1	N	3932	4103	4111	73	0
2	1	752	775	775	25	0
2	2	752	775	775	19	0
2	O	752	775	775	18	0
2	P	752	775	775	28	0
2	Q	752	775	775	25	0
2	R	752	775	775	23	0
2	S	752	775	775	17	0
2	T	752	775	775	25	0
2	U	752	775	775	34	1
2	V	752	775	775	14	0
2	W	752	775	775	19	0
2	X	752	775	775	23	0
2	Y	752	775	775	23	0
2	Z	752	775	775	19	0
3	A	27	0	12	3	0
3	B	27	0	12	3	0
3	C	27	0	12	8	0
3	D	27	0	12	4	0
3	E	27	0	12	3	0
3	F	27	0	12	2	0
3	G	27	0	12	6	0
3	H	27	0	12	2	0
3	I	27	0	12	5	0
3	J	27	0	12	4	0
3	K	27	0	12	2	0
3	L	27	0	12	3	0
3	M	27	0	12	3	0
3	N	27	0	12	5	0
4	A	4	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	B	4	0	0	2	0
4	C	4	0	0	2	0
4	D	4	0	0	3	0
4	E	4	0	0	2	0
4	F	4	0	0	2	0
4	G	4	0	0	4	0
4	H	4	0	0	2	0
4	I	4	0	0	2	0
4	J	4	0	0	3	0
4	K	4	0	0	0	0
4	L	4	0	0	2	0
4	M	4	0	0	1	0
4	N	4	0	0	2	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
5	C	1	0	0	0	0
5	D	1	0	0	0	0
5	E	1	0	0	0	0
5	F	1	0	0	0	0
5	G	1	0	0	0	0
5	H	1	0	0	0	0
5	I	1	0	0	0	0
5	J	1	0	0	0	0
5	K	1	0	0	0	0
5	L	1	0	0	0	0
5	M	1	0	0	0	0
5	N	1	0	0	0	0
6	A	1	0	0	0	0
6	B	1	0	0	0	0
6	C	1	0	0	0	0
6	D	1	0	0	0	0
6	E	1	0	0	0	0
6	F	1	0	0	0	0
6	G	1	0	0	0	0
6	H	1	0	0	0	0
6	I	1	0	0	0	0
6	J	1	0	0	0	0
6	K	1	0	0	0	0
6	L	1	0	0	0	0
6	M	1	0	0	0	0
6	N	1	0	0	0	0
All	All	66038	68273	68568	1510	2

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 11.

The worst 5 of 1510 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:L:31:MET:O	1:L:455:ILE:CD1	1.69	1.40
1:L:95:LEU:HD21	1:L:451:PRO:CG	1.59	1.29
1:L:31:MET:C	1:L:455:ILE:HD13	1.60	1.22
1:L:95:LEU:CD2	1:L:451:PRO:HG3	1.69	1.21
1:L:31:MET:SD	1:L:454:THR:HG22	1.83	1.18

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:J:352:GLU:OE2	2:U:8:LYS:HZ2[2_555]	1.48	0.12
1:J:316:HIS:NE2	1:F:269:VAL:O[2_555]	2.17	0.03

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	526/549 (96%)	491 (93%)	34 (6%)	1 (0%)	47 78
1	B	526/549 (96%)	490 (93%)	35 (7%)	1 (0%)	47 78
1	C	526/549 (96%)	490 (93%)	35 (7%)	1 (0%)	47 78
1	D	526/549 (96%)	491 (93%)	33 (6%)	2 (0%)	34 69
1	E	526/549 (96%)	488 (93%)	36 (7%)	2 (0%)	34 69
1	F	526/549 (96%)	490 (93%)	35 (7%)	1 (0%)	47 78
1	G	526/549 (96%)	489 (93%)	35 (7%)	2 (0%)	34 69
1	H	526/549 (96%)	488 (93%)	36 (7%)	2 (0%)	34 69

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	I	526/549 (96%)	485 (92%)	40 (8%)	1 (0%)	47	78
1	J	526/549 (96%)	489 (93%)	36 (7%)	1 (0%)	47	78
1	K	526/549 (96%)	492 (94%)	33 (6%)	1 (0%)	47	78
1	L	526/549 (96%)	495 (94%)	29 (6%)	2 (0%)	34	69
1	M	526/549 (96%)	489 (93%)	34 (6%)	3 (1%)	25	62
1	N	526/549 (96%)	488 (93%)	37 (7%)	1 (0%)	47	78
2	1	98/102 (96%)	82 (84%)	16 (16%)	0	100	100
2	2	98/102 (96%)	80 (82%)	18 (18%)	0	100	100
2	O	98/102 (96%)	82 (84%)	16 (16%)	0	100	100
2	P	98/102 (96%)	79 (81%)	19 (19%)	0	100	100
2	Q	98/102 (96%)	80 (82%)	18 (18%)	0	100	100
2	R	98/102 (96%)	80 (82%)	18 (18%)	0	100	100
2	S	98/102 (96%)	80 (82%)	18 (18%)	0	100	100
2	T	98/102 (96%)	80 (82%)	18 (18%)	0	100	100
2	U	98/102 (96%)	82 (84%)	16 (16%)	0	100	100
2	V	98/102 (96%)	81 (83%)	17 (17%)	0	100	100
2	W	98/102 (96%)	80 (82%)	18 (18%)	0	100	100
2	X	98/102 (96%)	82 (84%)	16 (16%)	0	100	100
2	Y	98/102 (96%)	80 (82%)	18 (18%)	0	100	100
2	Z	98/102 (96%)	81 (83%)	17 (17%)	0	100	100
All	All	8736/9114 (96%)	7984 (91%)	731 (8%)	21 (0%)	47	78

5 of 21 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	J	269	VAL
1	I	269	VAL
1	H	269	VAL
1	N	269	VAL
1	M	269	VAL

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	426/437 (98%)	423 (99%)	3 (1%)	84	91
1	B	426/437 (98%)	424 (100%)	2 (0%)	88	94
1	C	426/437 (98%)	424 (100%)	2 (0%)	88	94
1	D	426/437 (98%)	424 (100%)	2 (0%)	88	94
1	E	426/437 (98%)	423 (99%)	3 (1%)	84	91
1	F	426/437 (98%)	422 (99%)	4 (1%)	78	88
1	G	426/437 (98%)	424 (100%)	2 (0%)	88	94
1	H	426/437 (98%)	424 (100%)	2 (0%)	88	94
1	I	426/437 (98%)	424 (100%)	2 (0%)	88	94
1	J	426/437 (98%)	423 (99%)	3 (1%)	84	91
1	K	426/437 (98%)	423 (99%)	3 (1%)	84	91
1	L	426/437 (98%)	423 (99%)	3 (1%)	84	91
1	M	426/437 (98%)	424 (100%)	2 (0%)	88	94
1	N	426/437 (98%)	424 (100%)	2 (0%)	88	94
2	1	80/82 (98%)	80 (100%)	0	100	100
2	2	80/82 (98%)	80 (100%)	0	100	100
2	O	80/82 (98%)	80 (100%)	0	100	100
2	P	80/82 (98%)	80 (100%)	0	100	100
2	Q	80/82 (98%)	80 (100%)	0	100	100
2	R	80/82 (98%)	80 (100%)	0	100	100
2	S	80/82 (98%)	80 (100%)	0	100	100
2	T	80/82 (98%)	80 (100%)	0	100	100
2	U	80/82 (98%)	80 (100%)	0	100	100
2	V	80/82 (98%)	80 (100%)	0	100	100
2	W	80/82 (98%)	80 (100%)	0	100	100
2	X	80/82 (98%)	80 (100%)	0	100	100
2	Y	80/82 (98%)	80 (100%)	0	100	100
2	Z	80/82 (98%)	80 (100%)	0	100	100
All	All	7084/7266 (98%)	7049 (100%)	35 (0%)	88	94

5 of 35 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	284	ASN
1	C	308	LEU
1	A	284	ASN
1	L	308	LEU
1	L	284	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 6 such sidechains are listed below:

Mol	Chain	Res	Type
1	K	288	GLN
1	G	288	GLN
1	C	288	GLN
1	M	288	GLN
1	H	353	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 56 ligands modelled in this entry, 28 are monoatomic - leaving 28 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
4	BEF	D	602	-	0,3,3	-	-	-		
4	BEF	B	602	3	0,3,3	-	-	-		
3	ADP	L	601	6	24,29,29	0.98	2 (8%)	29,45,45	1.95	6 (20%)
3	ADP	E	601	6,5	24,29,29	0.95	1 (4%)	29,45,45	1.50	6 (20%)
3	ADP	J	601	6,5	24,29,29	0.99	1 (4%)	29,45,45	1.61	4 (13%)
3	ADP	N	601	6,5,4	24,29,29	0.95	1 (4%)	29,45,45	1.70	4 (13%)
4	BEF	K	602	-	0,3,3	-	-	-		
4	BEF	G	602	3	0,3,3	-	-	-		
3	ADP	G	601	6,5,4	24,29,29	1.00	2 (8%)	29,45,45	1.91	4 (13%)
3	ADP	C	601	6	24,29,29	0.95	1 (4%)	29,45,45	2.49	9 (31%)
4	BEF	H	602	3	0,3,3	-	-	-		
4	BEF	F	602	3	0,3,3	-	-	-		
4	BEF	I	602	-	0,3,3	-	-	-		
4	BEF	A	602	3	0,3,3	-	-	-		
3	ADP	A	601	6,5,4	24,29,29	0.91	1 (4%)	29,45,45	1.79	7 (24%)
4	BEF	J	602	-	0,3,3	-	-	-		
3	ADP	B	601	6,5,4	24,29,29	0.90	1 (4%)	29,45,45	1.74	3 (10%)
3	ADP	F	601	6,4	24,29,29	1.00	1 (4%)	29,45,45	1.94	6 (20%)
4	BEF	L	602	-	0,3,3	-	-	-		
4	BEF	C	602	-	0,3,3	-	-	-		
3	ADP	I	601	6	24,29,29	1.07	2 (8%)	29,45,45	1.72	5 (17%)
3	ADP	M	601	6,5	24,29,29	0.98	1 (4%)	29,45,45	1.96	3 (10%)
3	ADP	D	601	6,5	24,29,29	0.93	1 (4%)	29,45,45	1.69	6 (20%)
4	BEF	M	602	-	0,3,3	-	-	-		
4	BEF	N	602	3	0,3,3	-	-	-		
3	ADP	K	601	6,5	24,29,29	1.00	1 (4%)	29,45,45	1.45	5 (17%)
4	BEF	E	602	-	0,3,3	-	-	-		
3	ADP	H	601	6,5,4	24,29,29	0.93	1 (4%)	29,45,45	1.74	4 (13%)

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
3	ADP	B	601	6,5,4	-	0/12/32/32	0/3/3/3
3	ADP	F	601	6,4	-	2/12/32/32	0/3/3/3
3	ADP	L	601	6	-	0/12/32/32	0/3/3/3
3	ADP	I	601	6	-	2/12/32/32	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	ADP	G	601	6,5,4	-	2/12/32/32	0/3/3/3
3	ADP	C	601	6	-	6/12/32/32	0/3/3/3
3	ADP	K	601	6,5	-	9/12/32/32	0/3/3/3
3	ADP	M	601	6,5	-	3/12/32/32	0/3/3/3
3	ADP	E	601	6,5	-	8/12/32/32	0/3/3/3
3	ADP	J	601	6,5	-	4/12/32/32	0/3/3/3
3	ADP	D	601	6,5	-	4/12/32/32	0/3/3/3
3	ADP	N	601	6,5,4	-	0/12/32/32	0/3/3/3
3	ADP	H	601	6,5,4	-	0/12/32/32	0/3/3/3
3	ADP	A	601	6,5,4	-	3/12/32/32	0/3/3/3

The worst 5 of 17 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	K	601	ADP	C5-C4	2.70	1.48	1.40
3	I	601	ADP	C5-C4	2.68	1.48	1.40
3	E	601	ADP	C5-C4	2.58	1.47	1.40
3	J	601	ADP	C5-C4	2.56	1.47	1.40
3	F	601	ADP	C5-C4	2.55	1.47	1.40

The worst 5 of 72 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	601	ADP	PA-O3A-PB	-8.66	103.11	132.83
3	M	601	ADP	PA-O3A-PB	-7.68	106.47	132.83
3	G	601	ADP	PA-O3A-PB	-6.98	108.88	132.83
3	F	601	ADP	PA-O3A-PB	-6.84	109.37	132.83
3	L	601	ADP	PA-O3A-PB	-6.78	109.55	132.83

There are no chirality outliers.

5 of 43 torsion outliers are listed below:

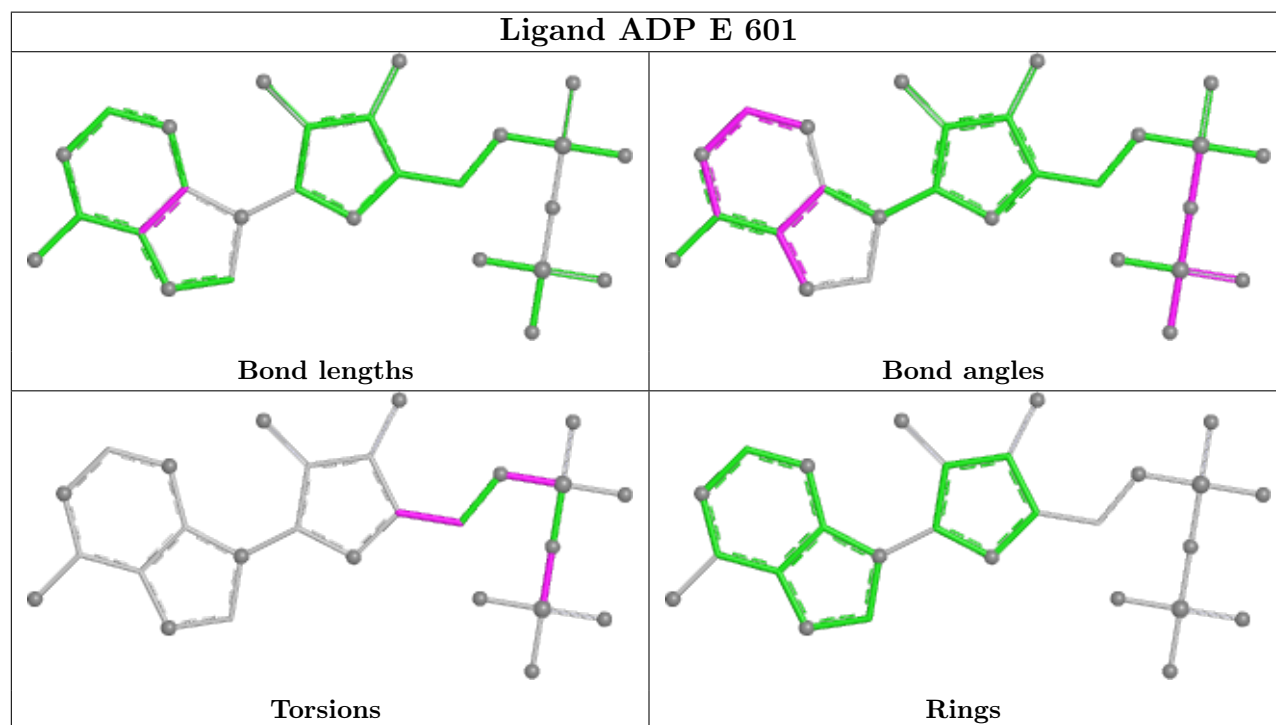
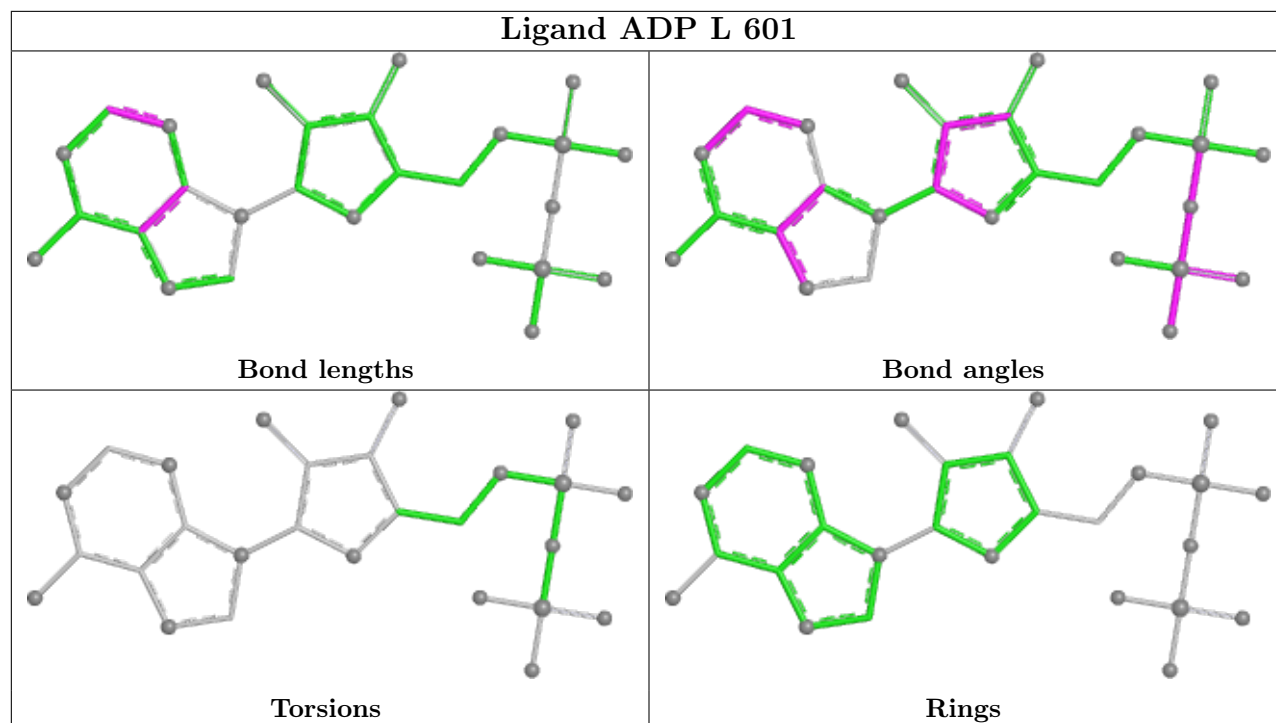
Mol	Chain	Res	Type	Atoms
3	K	601	ADP	PA-O3A-PB-O2B
3	K	601	ADP	C5'-O5'-PA-O3A
3	E	601	ADP	C5'-O5'-PA-O1A
3	E	601	ADP	C5'-O5'-PA-O2A
3	E	601	ADP	C5'-O5'-PA-O3A

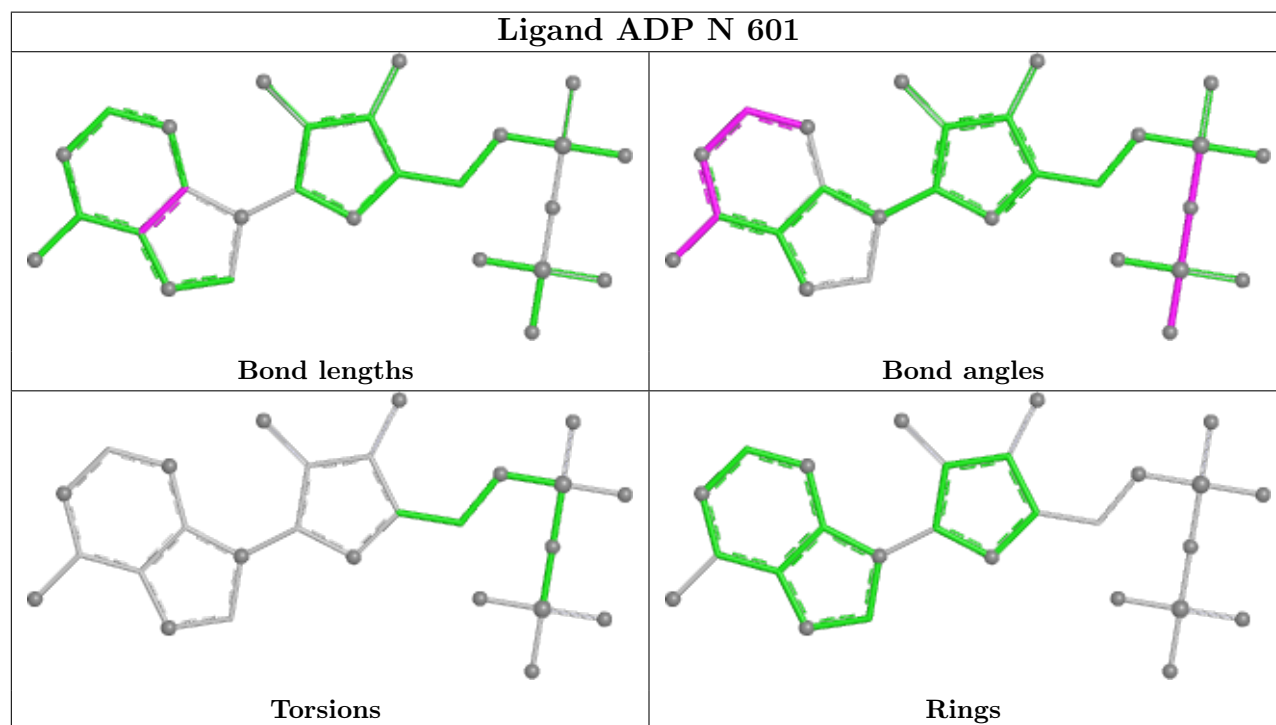
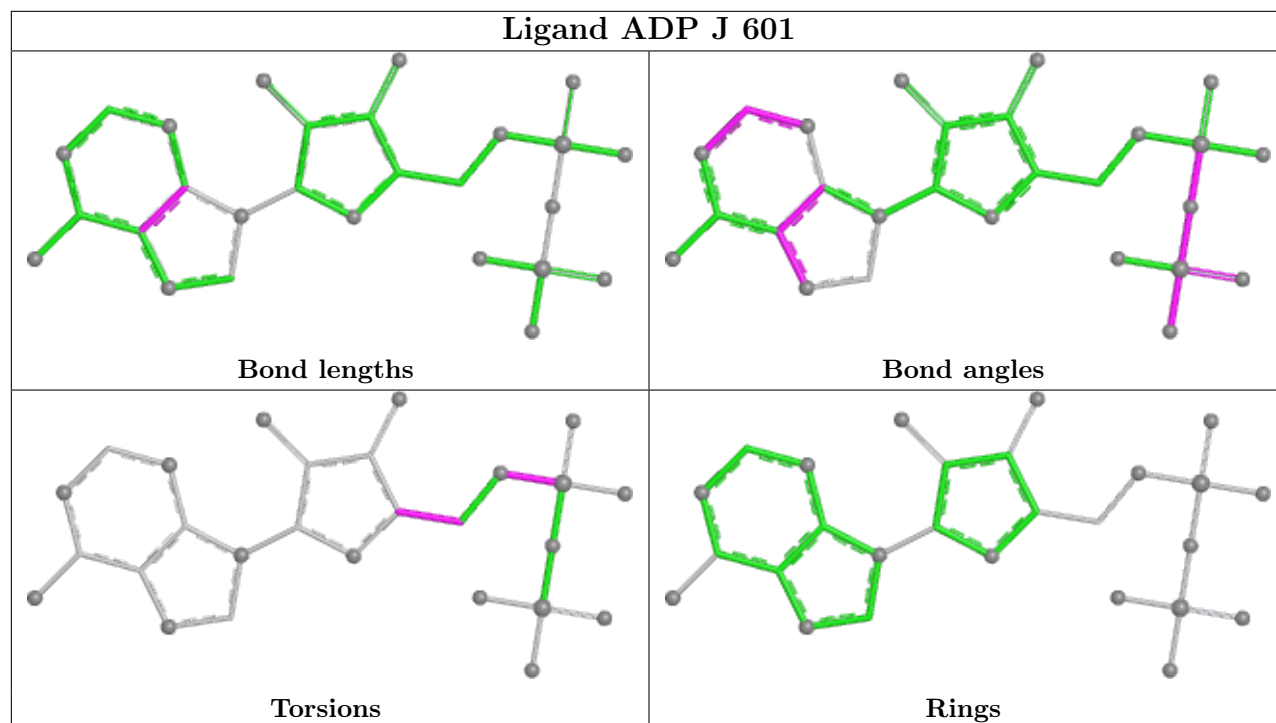
There are no ring outliers.

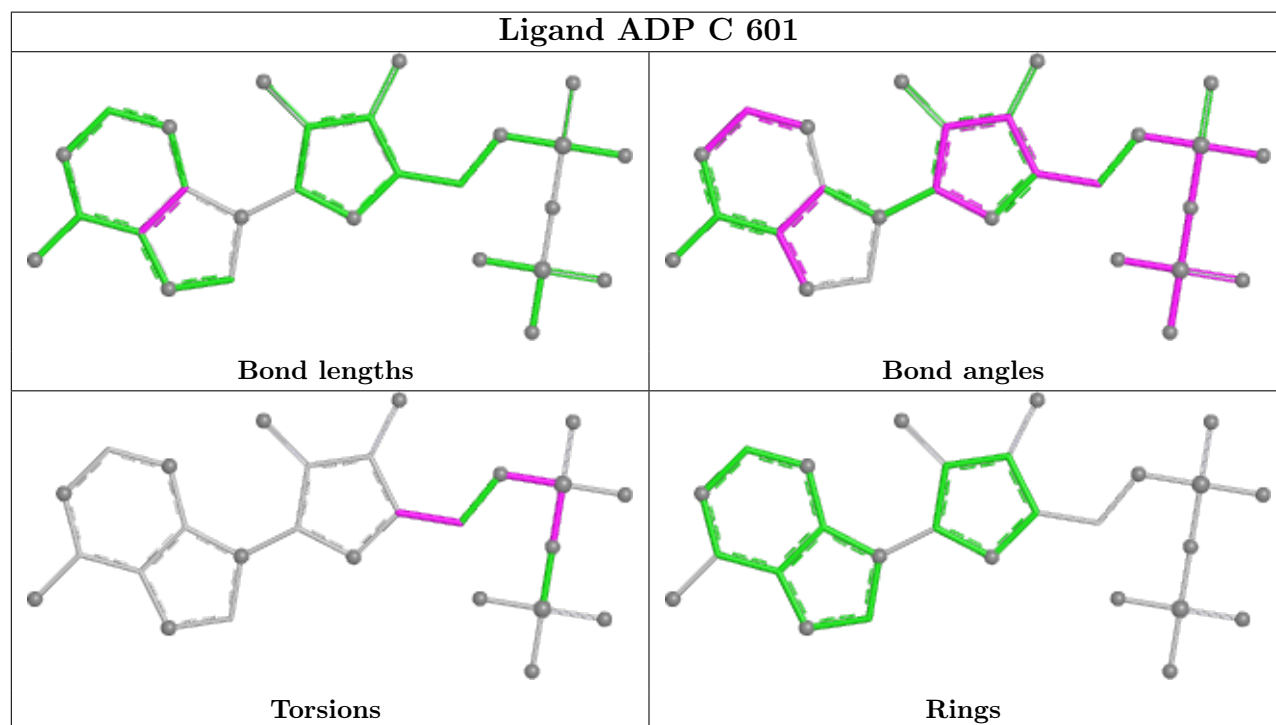
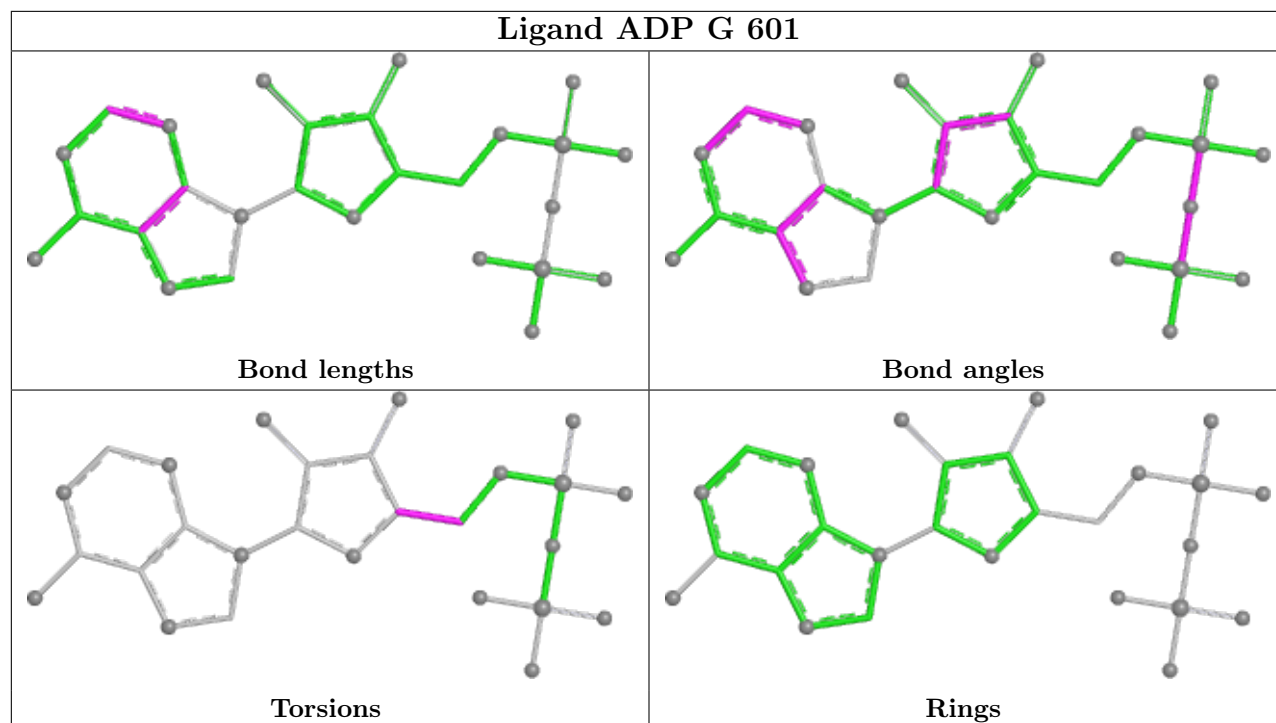
27 monomers are involved in 64 short contacts:

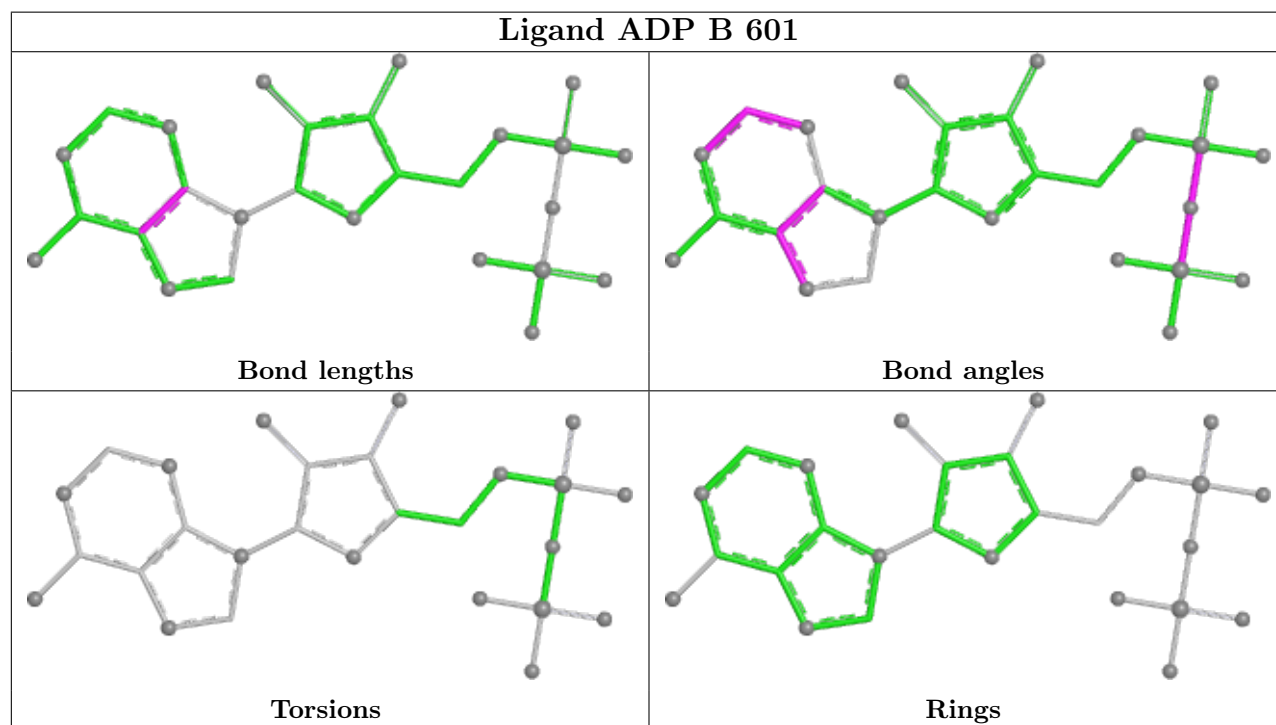
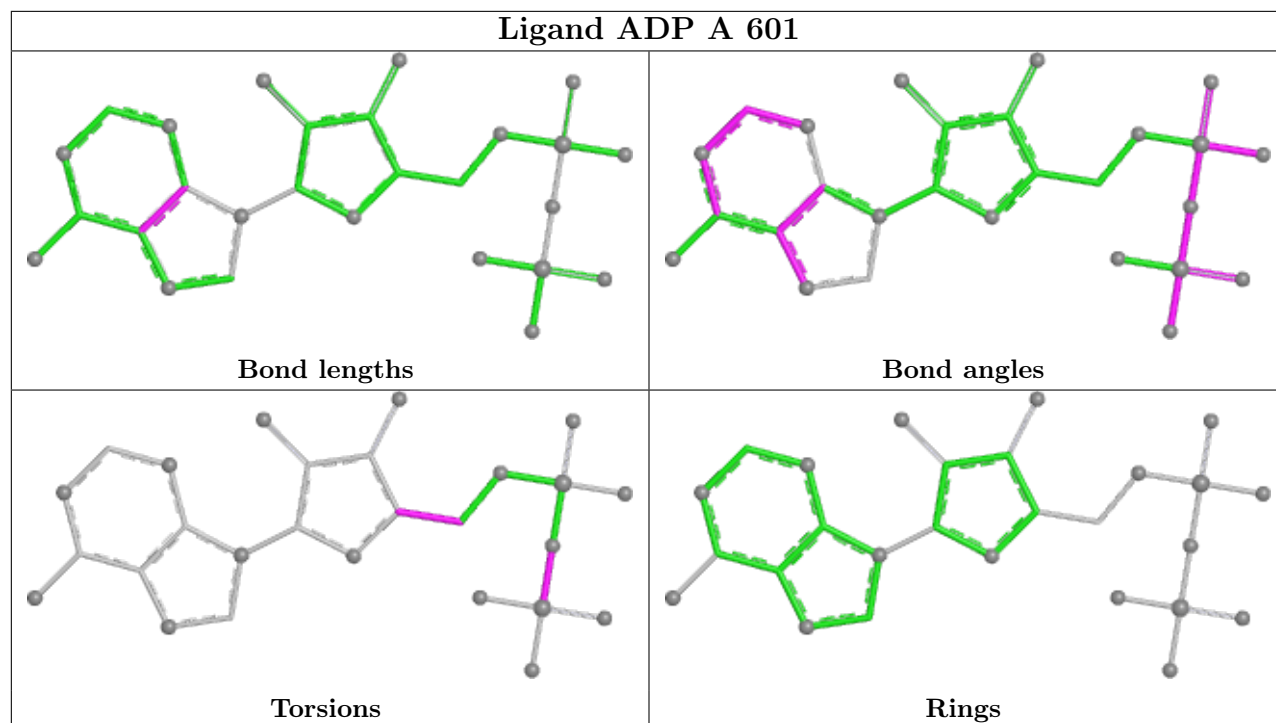
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	D	602	BEF	3	0
4	B	602	BEF	2	0
3	L	601	ADP	3	0
3	E	601	ADP	3	0
3	J	601	ADP	4	0
3	N	601	ADP	5	0
4	G	602	BEF	4	0
3	G	601	ADP	6	0
3	C	601	ADP	8	0
4	H	602	BEF	2	0
4	F	602	BEF	2	0
4	I	602	BEF	2	0
4	A	602	BEF	1	0
3	A	601	ADP	3	0
4	J	602	BEF	3	0
3	B	601	ADP	3	0
3	F	601	ADP	2	0
4	L	602	BEF	2	0
4	C	602	BEF	2	0
3	I	601	ADP	5	0
3	M	601	ADP	3	0
3	D	601	ADP	4	0
4	M	602	BEF	1	0
4	N	602	BEF	2	0
3	K	601	ADP	2	0
4	E	602	BEF	2	0
3	H	601	ADP	2	0

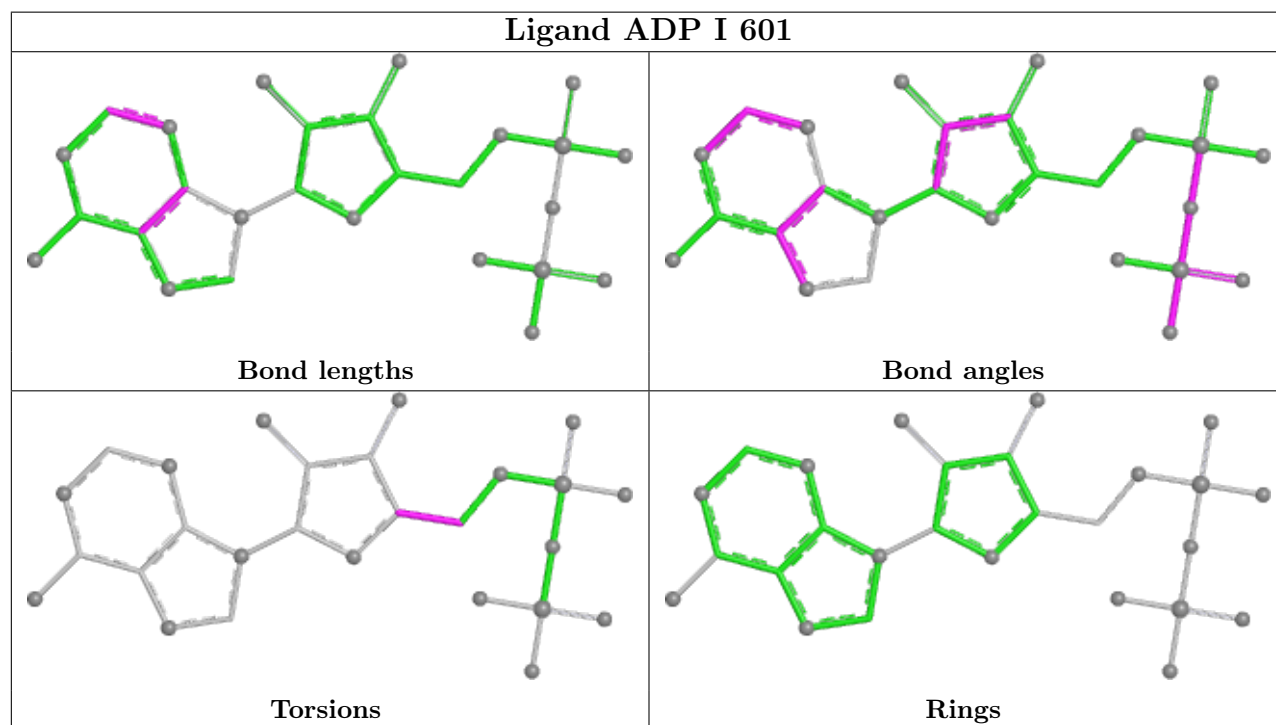
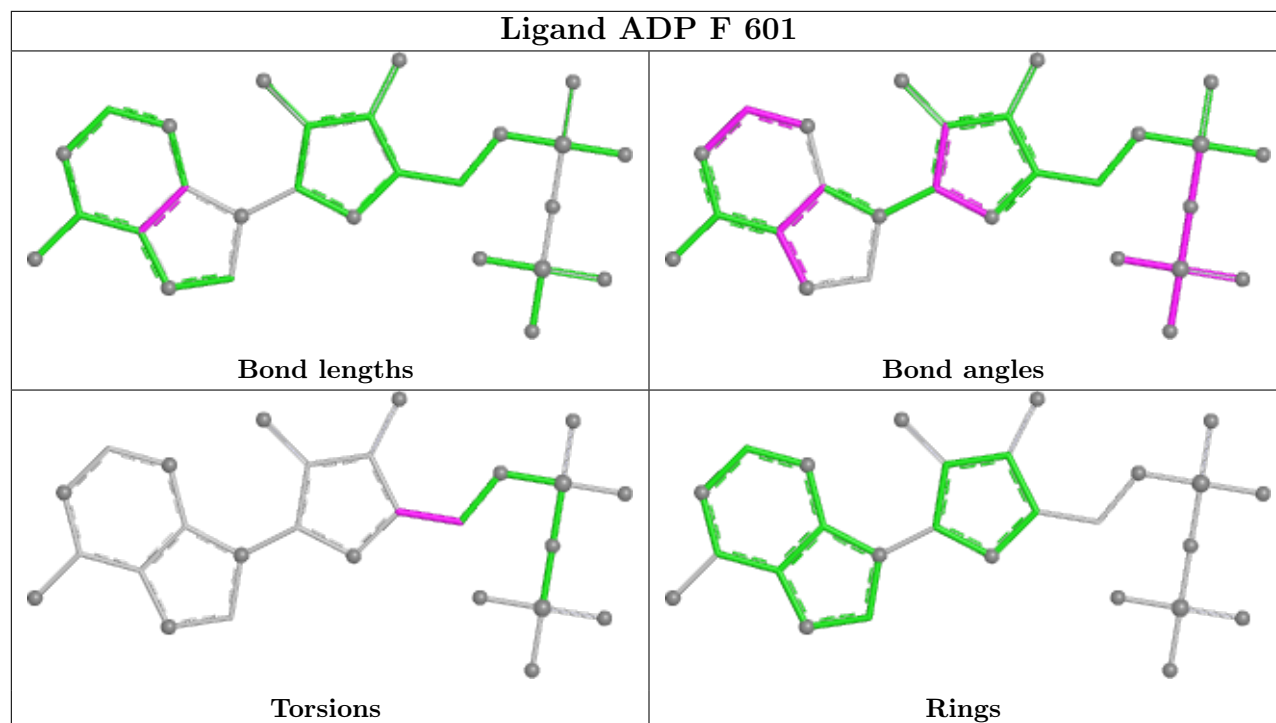
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

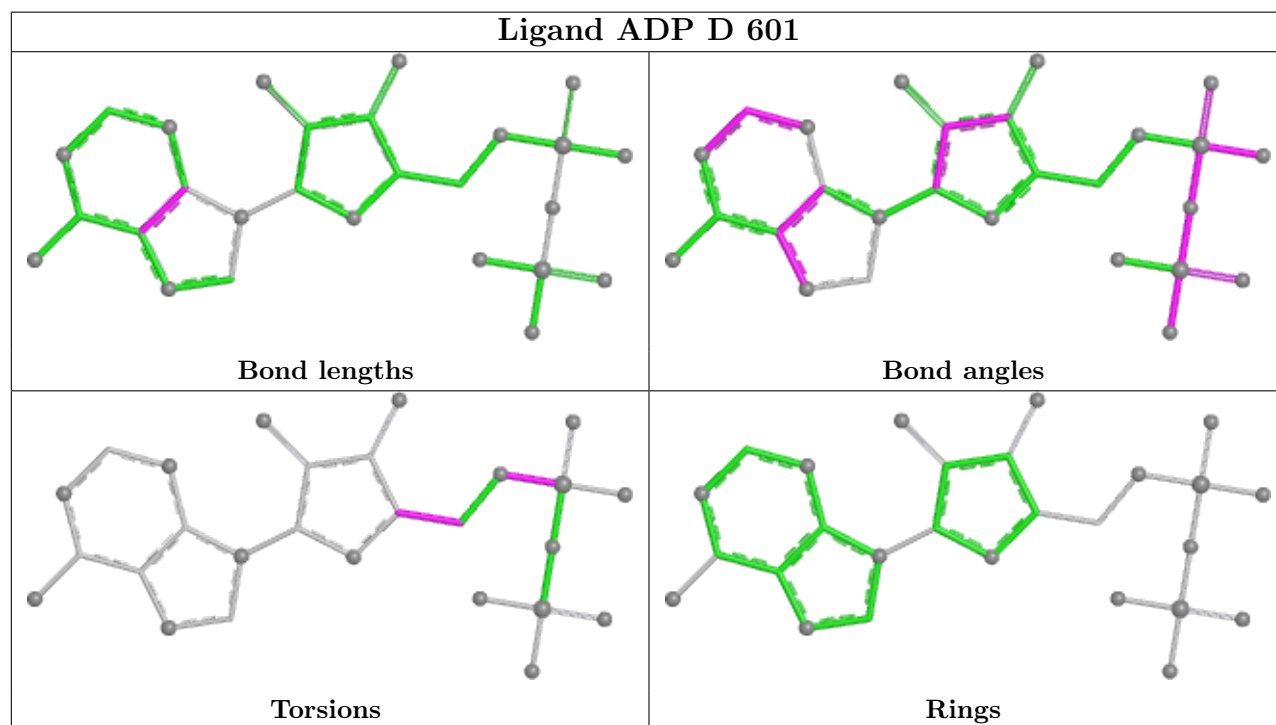
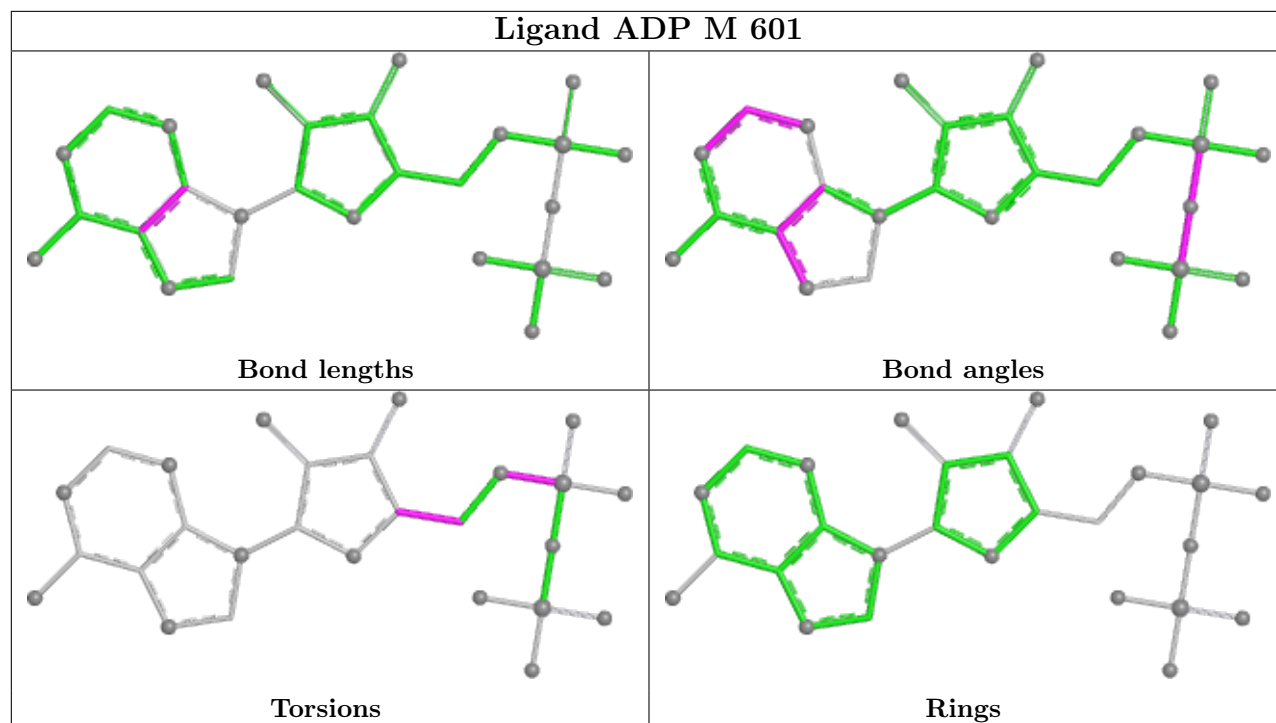


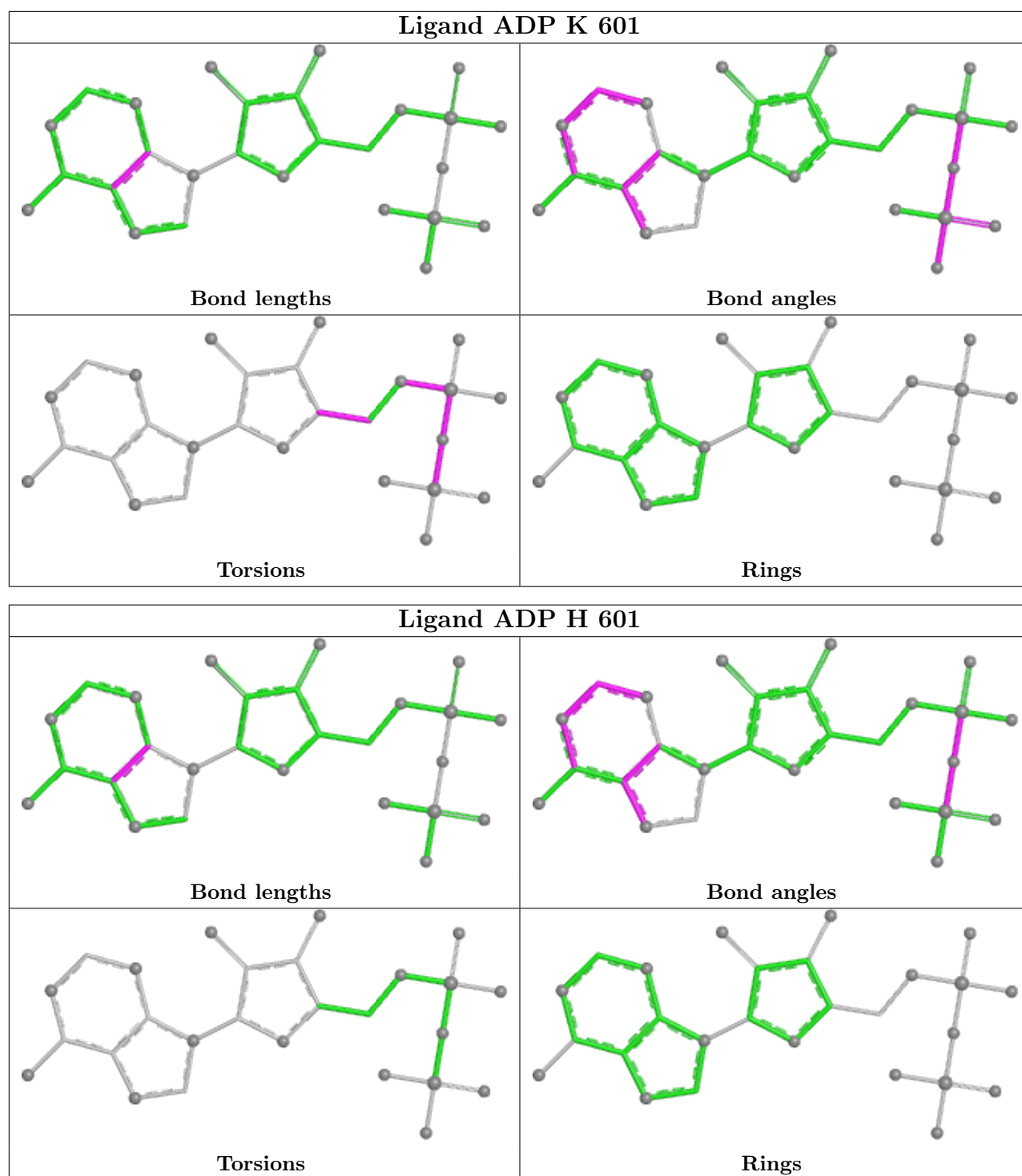












5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

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

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

Unable to reproduce the depositors R factor - this section is therefore empty.

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

Unable to reproduce the depositors R factor - this section is therefore empty.

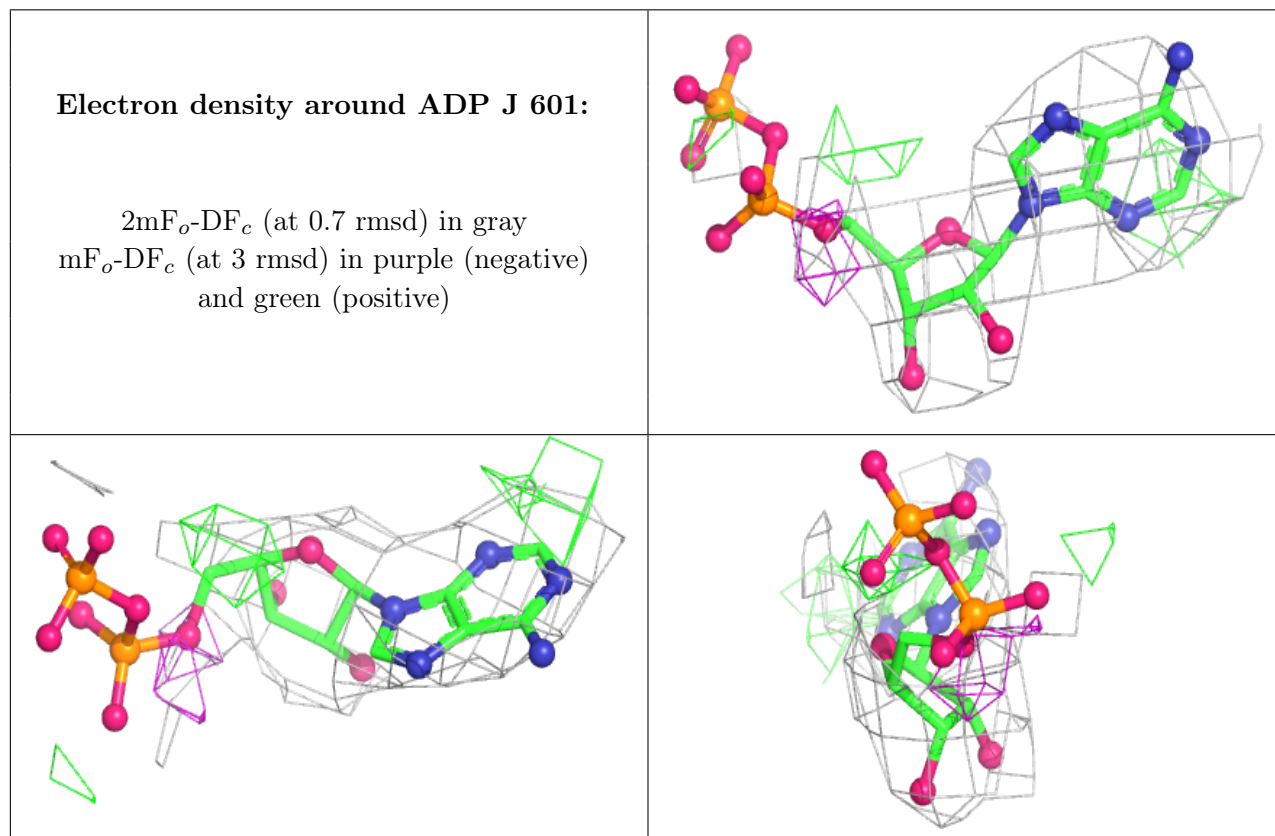
6.3 Carbohydrates [i](#)

Unable to reproduce the depositors R factor - this section is therefore empty.

6.4 Ligands [i](#)

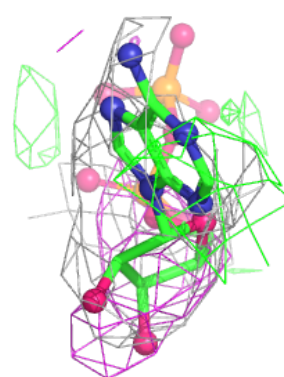
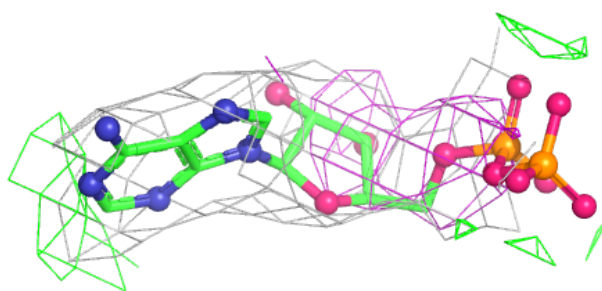
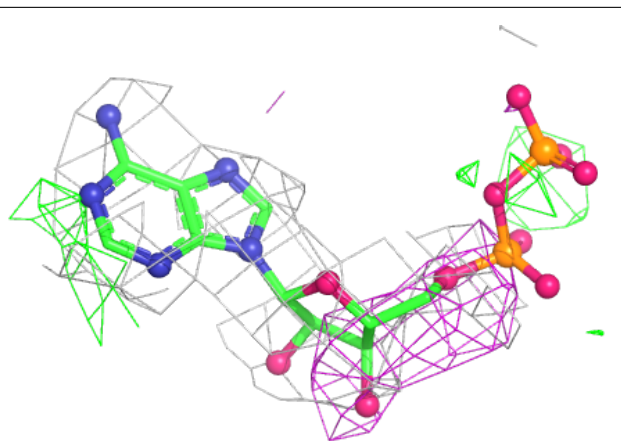
Unable to reproduce the depositors R factor - this section is therefore empty.

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.

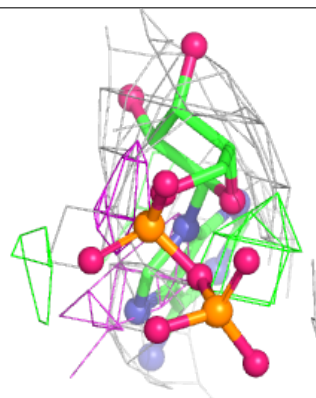
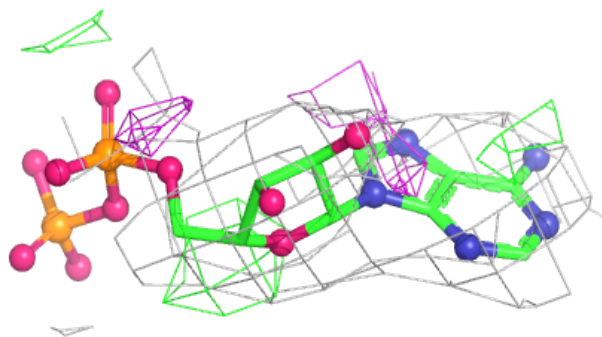
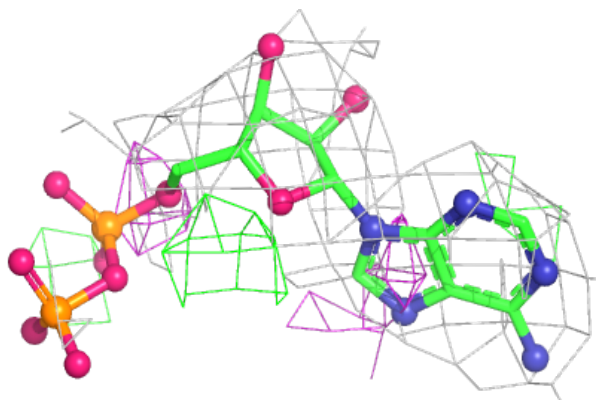


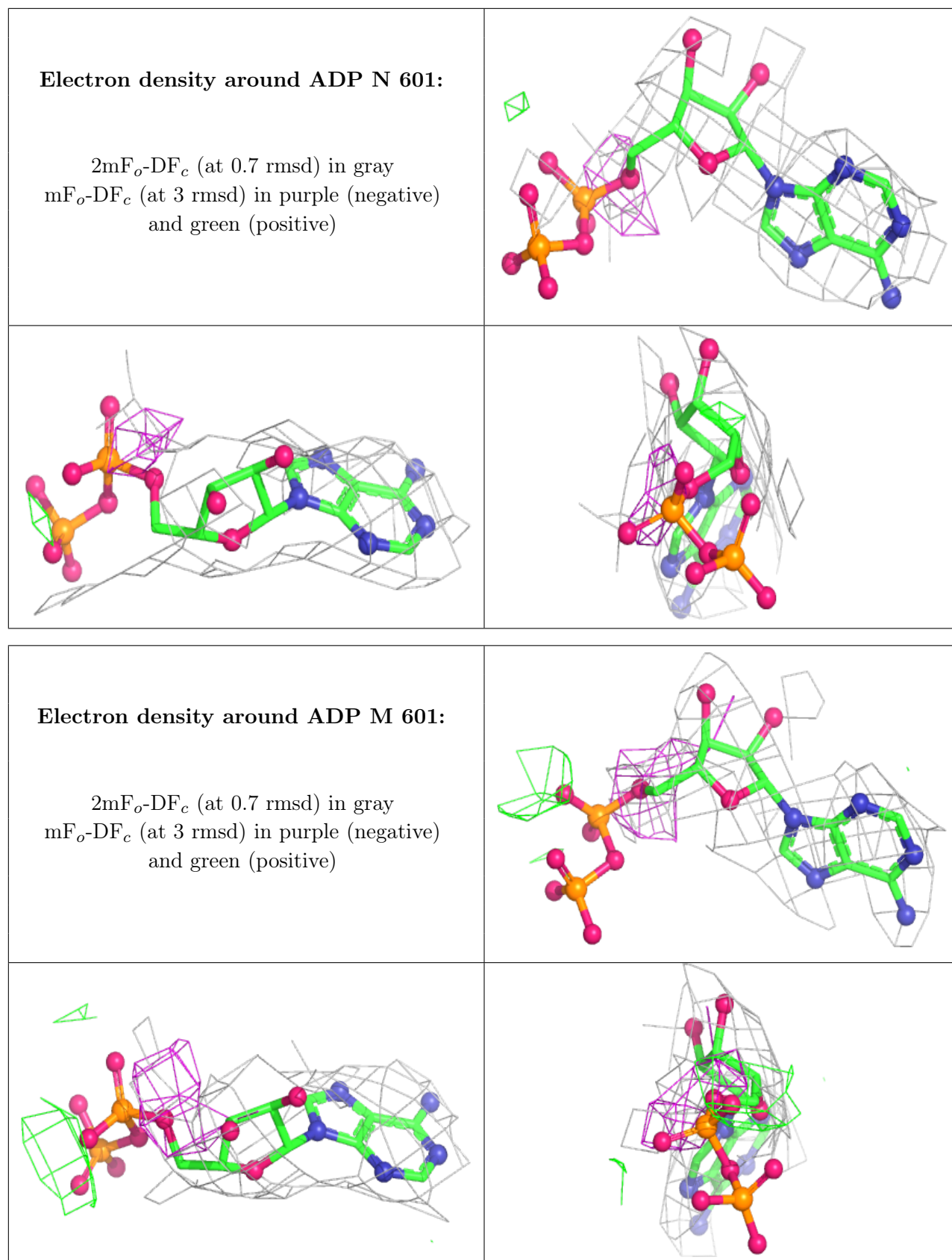
Electron density around ADP I 601:

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

**Electron density around ADP H 601:**

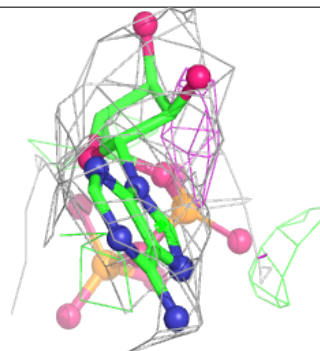
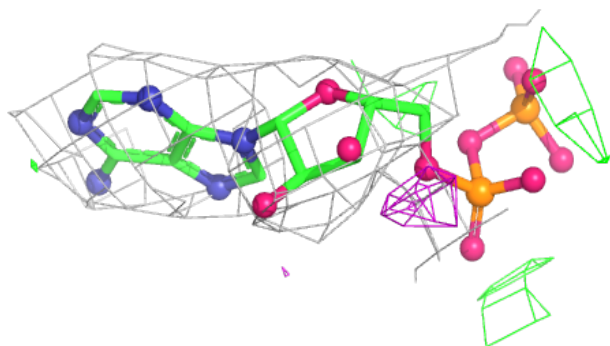
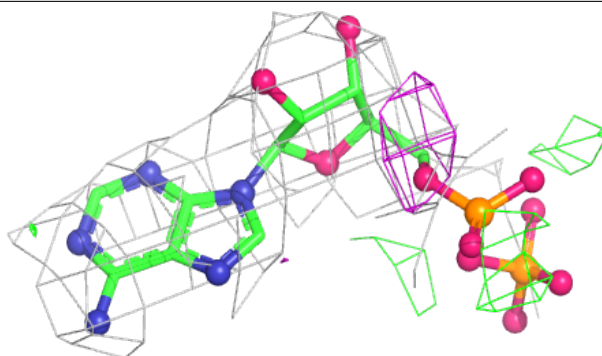
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



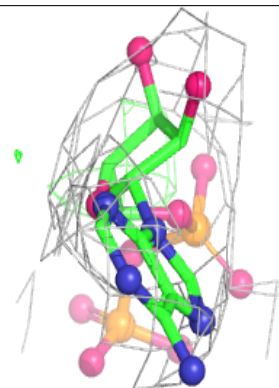
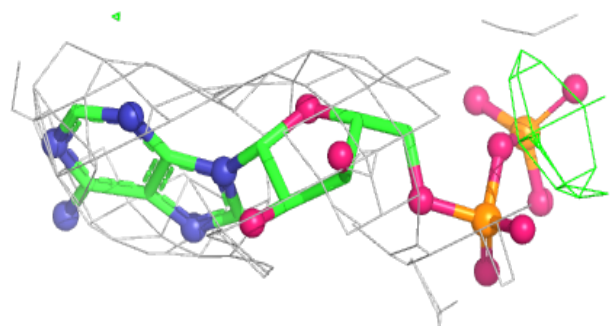
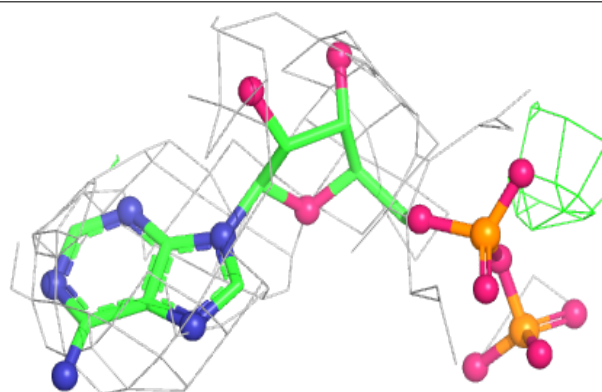


Electron density around ADP L 601:

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

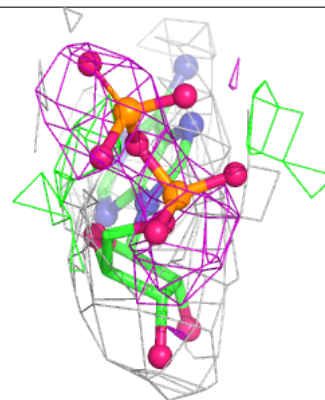
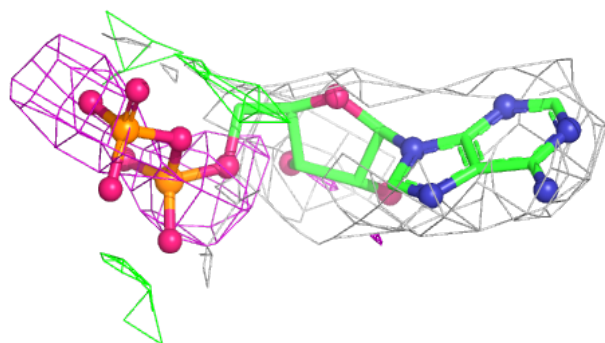
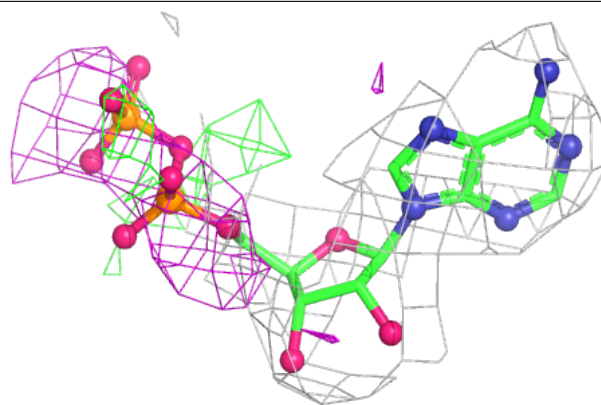
**Electron density around ADP K 601:**

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

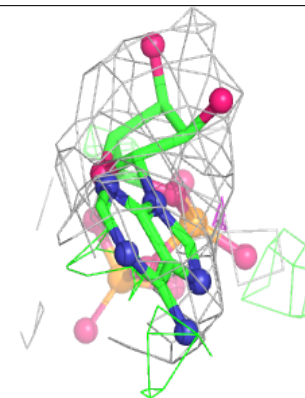
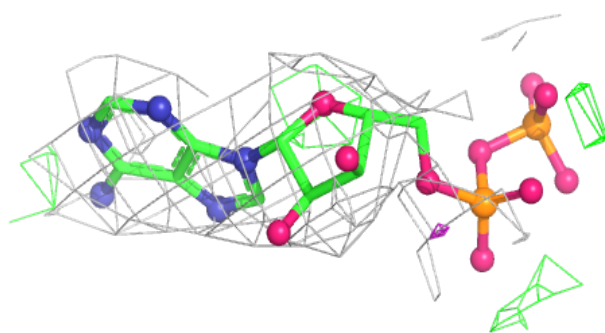
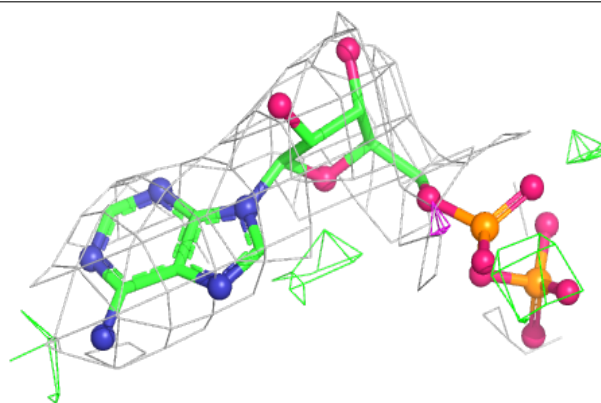


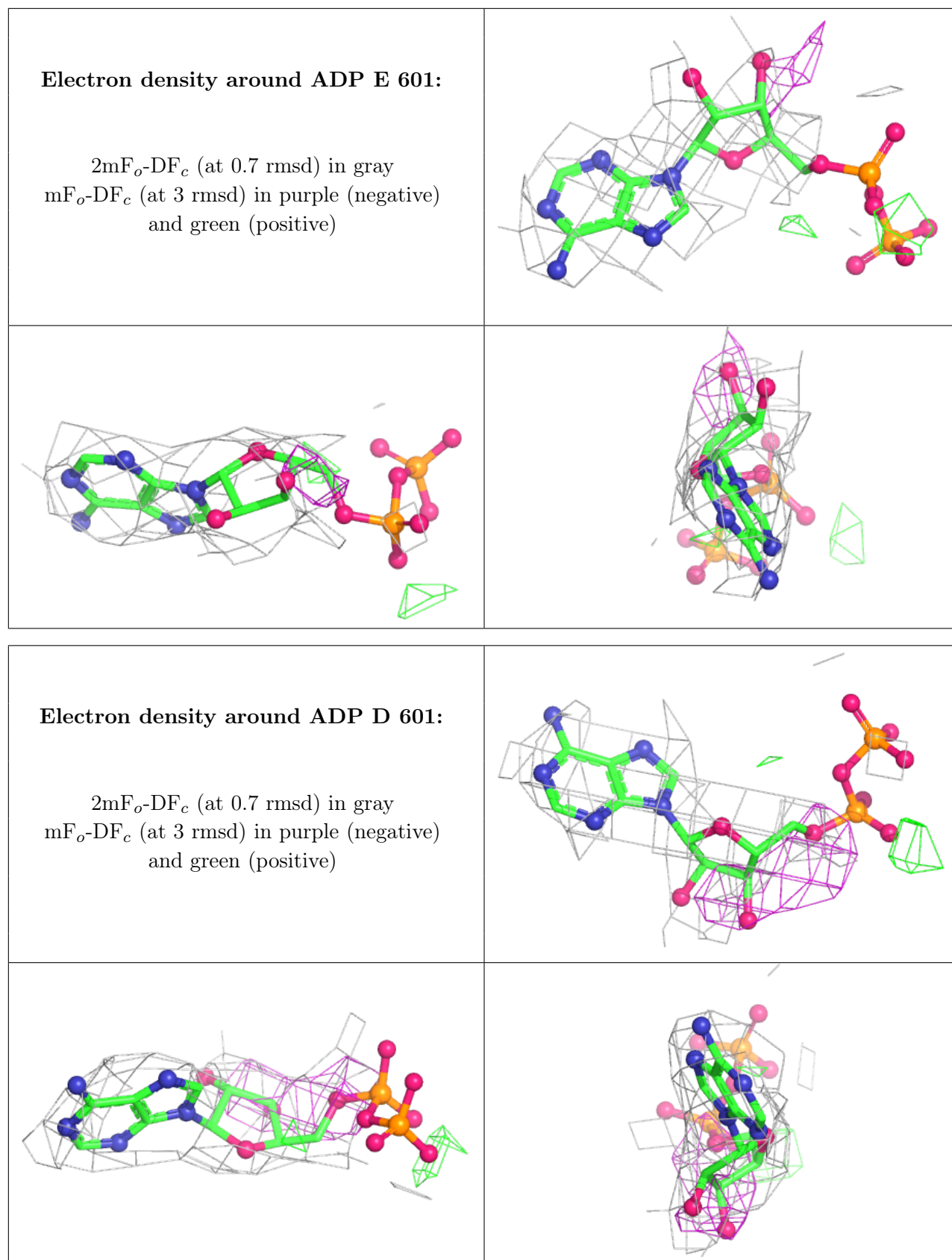
Electron density around ADP G 601:

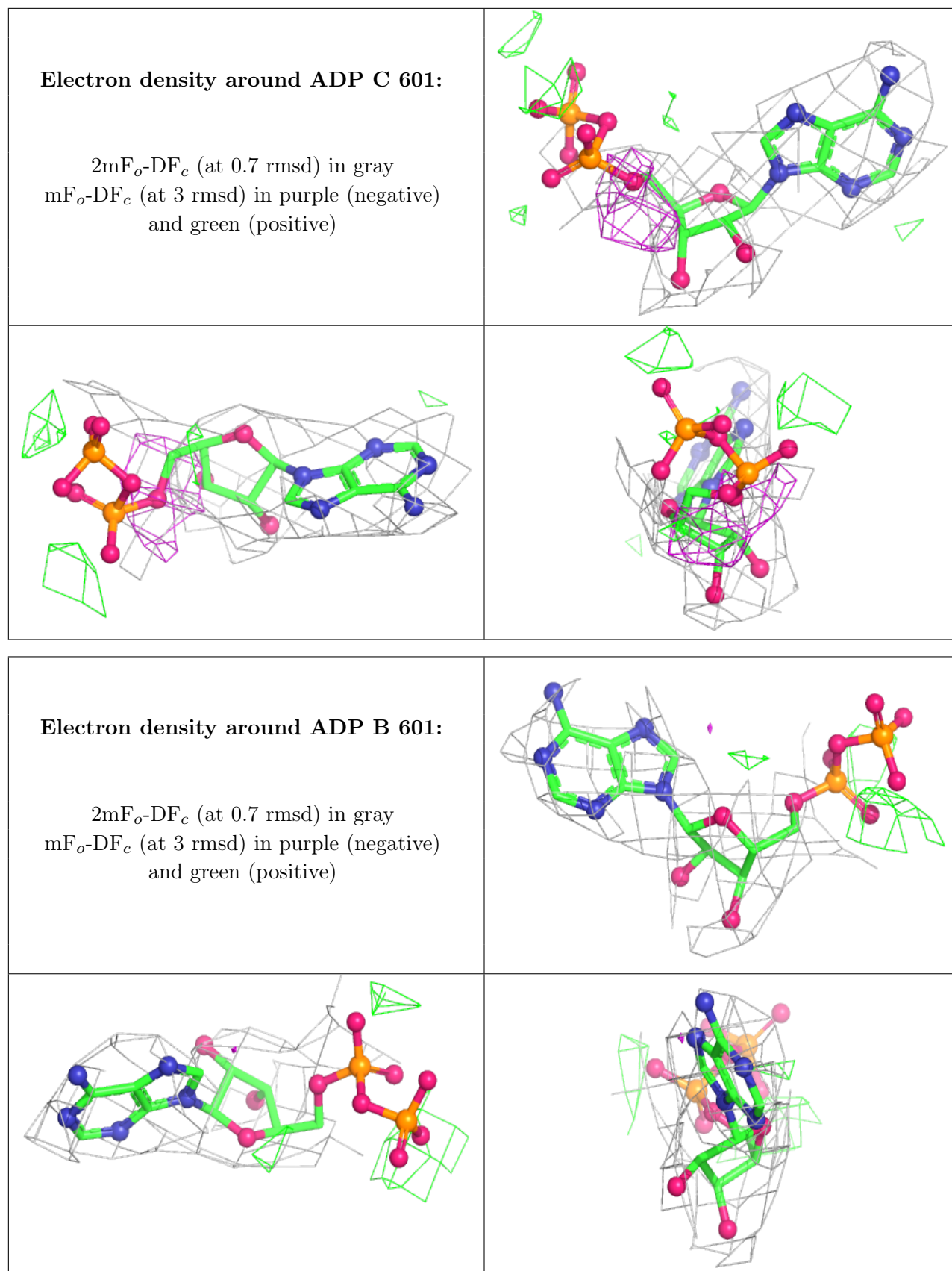
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

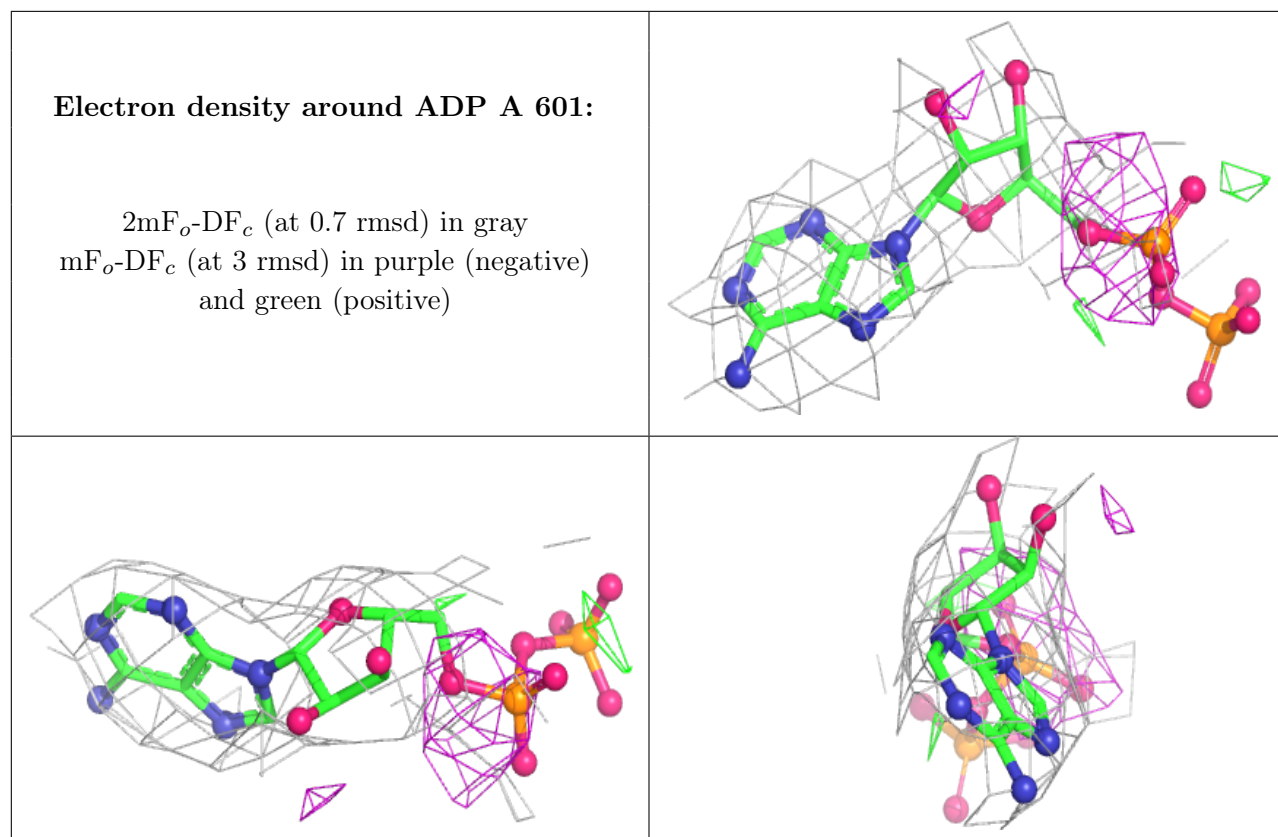
**Electron density around ADP F 601:**

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









6.5 Other polymers [i](#)

Unable to reproduce the depositors R factor - this section is therefore empty.