



Full wwPDB EM Validation Report ⓘ

Mar 17, 2026 – 04:24 PM UTC

PDB ID : 8U8O / pdb_00008u8o
EMDB ID : EMD-42026
Title : Human retinal variant phosphomimetic IMPDH1(546)-S477D filament bound
by ATP, IMP, and NAD⁺, octamer-centered
Authors : Calise, S.J.; Kollman, J.M.
Deposited on : 2023-09-18
Resolution : 2.40 Å(reported)

This is a Full wwPDB EM 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/EMValidationReportHelp>
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:

EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

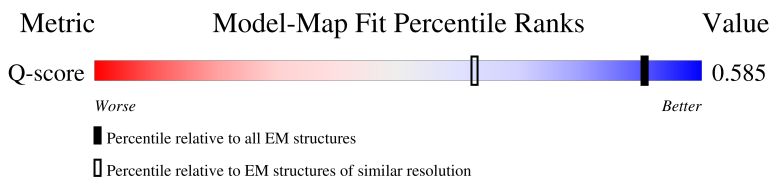
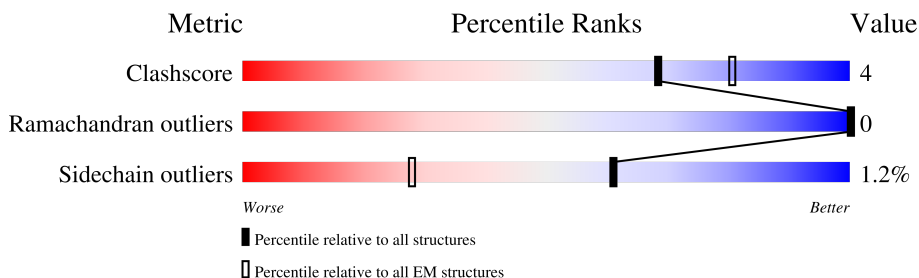
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.40 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)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	5628 (1.90 - 2.90)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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 $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	548	
1	B	548	
1	C	548	
1	D	548	

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Mol	Chain	Length	Quality of chain
1	E	548	 80%7%12%
1	F	548	 80%8%12%
1	G	548	 80%8%12%
1	H	548	 80%8%12%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 30080 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 Inosine-5'-monophosphate dehydrogenase 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	482	Total	C	N	O	S	0	0
			3631	2294	621	692	24		
1	B	482	Total	C	N	O	S	0	0
			3631	2294	621	692	24		
1	C	482	Total	C	N	O	S	0	0
			3631	2294	621	692	24		
1	D	482	Total	C	N	O	S	0	0
			3631	2294	621	692	24		
1	E	482	Total	C	N	O	S	0	0
			3631	2294	621	692	24		
1	F	482	Total	C	N	O	S	0	0
			3631	2294	621	692	24		
1	G	482	Total	C	N	O	S	0	0
			3631	2294	621	692	24		
1	H	482	Total	C	N	O	S	0	0
			3631	2294	621	692	24		

There are 320 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	GLY	-	expression tag	UNP P20839
A	0	SER	-	expression tag	UNP P20839
A	477	ASP	SER	engineered mutation	UNP P20839
A	510	THR	-	variant	UNP P20839
A	511	PHE	-	variant	UNP P20839
A	512	LEU	-	variant	UNP P20839
A	513	PRO	-	variant	UNP P20839
A	514	PHE	-	variant	UNP P20839
A	515	THR	-	variant	UNP P20839
A	516	LYS	-	variant	UNP P20839
A	517	SER	-	variant	UNP P20839
A	518	GLY	-	variant	UNP P20839
A	519	CYS	-	variant	UNP P20839
A	520	THR	-	variant	UNP P20839

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Chain	Residue	Modelled	Actual	Comment	Reference
A	521	GLU	-	variant	UNP P20839
A	522	ASP	-	variant	UNP P20839
A	523	SER	-	variant	UNP P20839
A	524	GLY	-	variant	UNP P20839
A	525	GLY	-	variant	UNP P20839
A	526	GLY	-	variant	UNP P20839
A	527	ARG	-	variant	UNP P20839
A	528	GLY	-	variant	UNP P20839
A	529	GLY	-	variant	UNP P20839
A	530	GLY	-	variant	UNP P20839
A	531	GLY	-	variant	UNP P20839
A	532	ASP	-	variant	UNP P20839
A	533	ALA	-	variant	UNP P20839
A	534	PRO	-	variant	UNP P20839
A	535	GLN	-	variant	UNP P20839
A	536	CYS	-	variant	UNP P20839
A	537	PRO	-	variant	UNP P20839
A	538	LEU	-	variant	UNP P20839
A	539	LEU	-	variant	UNP P20839
A	540	GLY	-	variant	UNP P20839
A	541	THR	-	variant	UNP P20839
A	542	ALA	-	variant	UNP P20839
A	543	SER	-	variant	UNP P20839
A	544	LEU	-	variant	UNP P20839
A	545	HIS	-	variant	UNP P20839
A	546	ASN	-	variant	UNP P20839
B	-1	GLY	-	expression tag	UNP P20839
B	0	SER	-	expression tag	UNP P20839
B	477	ASP	SER	engineered mutation	UNP P20839
B	510	THR	-	variant	UNP P20839
B	511	PHE	-	variant	UNP P20839
B	512	LEU	-	variant	UNP P20839
B	513	PRO	-	variant	UNP P20839
B	514	PHE	-	variant	UNP P20839
B	515	THR	-	variant	UNP P20839
B	516	LYS	-	variant	UNP P20839
B	517	SER	-	variant	UNP P20839
B	518	GLY	-	variant	UNP P20839
B	519	CYS	-	variant	UNP P20839
B	520	THR	-	variant	UNP P20839
B	521	GLU	-	variant	UNP P20839
B	522	ASP	-	variant	UNP P20839

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Chain	Residue	Modelled	Actual	Comment	Reference
B	523	SER	-	variant	UNP P20839
B	524	GLY	-	variant	UNP P20839
B	525	GLY	-	variant	UNP P20839
B	526	GLY	-	variant	UNP P20839
B	527	ARG	-	variant	UNP P20839
B	528	GLY	-	variant	UNP P20839
B	529	GLY	-	variant	UNP P20839
B	530	GLY	-	variant	UNP P20839
B	531	GLY	-	variant	UNP P20839
B	532	ASP	-	variant	UNP P20839
B	533	ALA	-	variant	UNP P20839
B	534	PRO	-	variant	UNP P20839
B	535	GLN	-	variant	UNP P20839
B	536	CYS	-	variant	UNP P20839
B	537	PRO	-	variant	UNP P20839
B	538	LEU	-	variant	UNP P20839
B	539	LEU	-	variant	UNP P20839
B	540	GLY	-	variant	UNP P20839
B	541	THR	-	variant	UNP P20839
B	542	ALA	-	variant	UNP P20839
B	543	SER	-	variant	UNP P20839
B	544	LEU	-	variant	UNP P20839
B	545	HIS	-	variant	UNP P20839
B	546	ASN	-	variant	UNP P20839
C	-1	GLY	-	expression tag	UNP P20839
C	0	SER	-	expression tag	UNP P20839
C	477	ASP	SER	engineered mutation	UNP P20839
C	510	THR	-	variant	UNP P20839
C	511	PHE	-	variant	UNP P20839
C	512	LEU	-	variant	UNP P20839
C	513	PRO	-	variant	UNP P20839
C	514	PHE	-	variant	UNP P20839
C	515	THR	-	variant	UNP P20839
C	516	LYS	-	variant	UNP P20839
C	517	SER	-	variant	UNP P20839
C	518	GLY	-	variant	UNP P20839
C	519	CYS	-	variant	UNP P20839
C	520	THR	-	variant	UNP P20839
C	521	GLU	-	variant	UNP P20839
C	522	ASP	-	variant	UNP P20839
C	523	SER	-	variant	UNP P20839
C	524	GLY	-	variant	UNP P20839

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Chain	Residue	Modelled	Actual	Comment	Reference
C	525	GLY	-	variant	UNP P20839
C	526	GLY	-	variant	UNP P20839
C	527	ARG	-	variant	UNP P20839
C	528	GLY	-	variant	UNP P20839
C	529	GLY	-	variant	UNP P20839
C	530	GLY	-	variant	UNP P20839
C	531	GLY	-	variant	UNP P20839
C	532	ASP	-	variant	UNP P20839
C	533	ALA	-	variant	UNP P20839
C	534	PRO	-	variant	UNP P20839
C	535	GLN	-	variant	UNP P20839
C	536	CYS	-	variant	UNP P20839
C	537	PRO	-	variant	UNP P20839
C	538	LEU	-	variant	UNP P20839
C	539	LEU	-	variant	UNP P20839
C	540	GLY	-	variant	UNP P20839
C	541	THR	-	variant	UNP P20839
C	542	ALA	-	variant	UNP P20839
C	543	SER	-	variant	UNP P20839
C	544	LEU	-	variant	UNP P20839
C	545	HIS	-	variant	UNP P20839
C	546	ASN	-	variant	UNP P20839
D	-1	GLY	-	expression tag	UNP P20839
D	0	SER	-	expression tag	UNP P20839
D	477	ASP	SER	engineered mutation	UNP P20839
D	510	THR	-	variant	UNP P20839
D	511	PHE	-	variant	UNP P20839
D	512	LEU	-	variant	UNP P20839
D	513	PRO	-	variant	UNP P20839
D	514	PHE	-	variant	UNP P20839
D	515	THR	-	variant	UNP P20839
D	516	LYS	-	variant	UNP P20839
D	517	SER	-	variant	UNP P20839
D	518	GLY	-	variant	UNP P20839
D	519	CYS	-	variant	UNP P20839
D	520	THR	-	variant	UNP P20839
D	521	GLU	-	variant	UNP P20839
D	522	ASP	-	variant	UNP P20839
D	523	SER	-	variant	UNP P20839
D	524	GLY	-	variant	UNP P20839
D	525	GLY	-	variant	UNP P20839
D	526	GLY	-	variant	UNP P20839

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Chain	Residue	Modelled	Actual	Comment	Reference
D	527	ARG	-	variant	UNP P20839
D	528	GLY	-	variant	UNP P20839
D	529	GLY	-	variant	UNP P20839
D	530	GLY	-	variant	UNP P20839
D	531	GLY	-	variant	UNP P20839
D	532	ASP	-	variant	UNP P20839
D	533	ALA	-	variant	UNP P20839
D	534	PRO	-	variant	UNP P20839
D	535	GLN	-	variant	UNP P20839
D	536	CYS	-	variant	UNP P20839
D	537	PRO	-	variant	UNP P20839
D	538	LEU	-	variant	UNP P20839
D	539	LEU	-	variant	UNP P20839
D	540	GLY	-	variant	UNP P20839
D	541	THR	-	variant	UNP P20839
D	542	ALA	-	variant	UNP P20839
D	543	SER	-	variant	UNP P20839
D	544	LEU	-	variant	UNP P20839
D	545	HIS	-	variant	UNP P20839
D	546	ASN	-	variant	UNP P20839
E	-1	GLY	-	expression tag	UNP P20839
E	0	SER	-	expression tag	UNP P20839
E	477	ASP	SER	engineered mutation	UNP P20839
E	510	THR	-	variant	UNP P20839
E	511	PHE	-	variant	UNP P20839
E	512	LEU	-	variant	UNP P20839
E	513	PRO	-	variant	UNP P20839
E	514	PHE	-	variant	UNP P20839
E	515	THR	-	variant	UNP P20839
E	516	LYS	-	variant	UNP P20839
E	517	SER	-	variant	UNP P20839
E	518	GLY	-	variant	UNP P20839
E	519	CYS	-	variant	UNP P20839
E	520	THR	-	variant	UNP P20839
E	521	GLU	-	variant	UNP P20839
E	522	ASP	-	variant	UNP P20839
E	523	SER	-	variant	UNP P20839
E	524	GLY	-	variant	UNP P20839
E	525	GLY	-	variant	UNP P20839
E	526	GLY	-	variant	UNP P20839
E	527	ARG	-	variant	UNP P20839
E	528	GLY	-	variant	UNP P20839

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Chain	Residue	Modelled	Actual	Comment	Reference
E	529	GLY	-	variant	UNP P20839
E	530	GLY	-	variant	UNP P20839
E	531	GLY	-	variant	UNP P20839
E	532	ASP	-	variant	UNP P20839
E	533	ALA	-	variant	UNP P20839
E	534	PRO	-	variant	UNP P20839
E	535	GLN	-	variant	UNP P20839
E	536	CYS	-	variant	UNP P20839
E	537	PRO	-	variant	UNP P20839
E	538	LEU	-	variant	UNP P20839
E	539	LEU	-	variant	UNP P20839
E	540	GLY	-	variant	UNP P20839
E	541	THR	-	variant	UNP P20839
E	542	ALA	-	variant	UNP P20839
E	543	SER	-	variant	UNP P20839
E	544	LEU	-	variant	UNP P20839
E	545	HIS	-	variant	UNP P20839
E	546	ASN	-	variant	UNP P20839
F	-1	GLY	-	expression tag	UNP P20839
F	0	SER	-	expression tag	UNP P20839
F	477	ASP	SER	engineered mutation	UNP P20839
F	510	THR	-	variant	UNP P20839
F	511	PHE	-	variant	UNP P20839
F	512	LEU	-	variant	UNP P20839
F	513	PRO	-	variant	UNP P20839
F	514	PHE	-	variant	UNP P20839
F	515	THR	-	variant	UNP P20839
F	516	LYS	-	variant	UNP P20839
F	517	SER	-	variant	UNP P20839
F	518	GLY	-	variant	UNP P20839
F	519	CYS	-	variant	UNP P20839
F	520	THR	-	variant	UNP P20839
F	521	GLU	-	variant	UNP P20839
F	522	ASP	-	variant	UNP P20839
F	523	SER	-	variant	UNP P20839
F	524	GLY	-	variant	UNP P20839
F	525	GLY	-	variant	UNP P20839
F	526	GLY	-	variant	UNP P20839
F	527	ARG	-	variant	UNP P20839
F	528	GLY	-	variant	UNP P20839
F	529	GLY	-	variant	UNP P20839
F	530	GLY	-	variant	UNP P20839

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Chain	Residue	Modelled	Actual	Comment	Reference
F	531	GLY	-	variant	UNP P20839
F	532	ASP	-	variant	UNP P20839
F	533	ALA	-	variant	UNP P20839
F	534	PRO	-	variant	UNP P20839
F	535	GLN	-	variant	UNP P20839
F	536	CYS	-	variant	UNP P20839
F	537	PRO	-	variant	UNP P20839
F	538	LEU	-	variant	UNP P20839
F	539	LEU	-	variant	UNP P20839
F	540	GLY	-	variant	UNP P20839
F	541	THR	-	variant	UNP P20839
F	542	ALA	-	variant	UNP P20839
F	543	SER	-	variant	UNP P20839
F	544	LEU	-	variant	UNP P20839
F	545	HIS	-	variant	UNP P20839
F	546	ASN	-	variant	UNP P20839
G	-1	GLY	-	expression tag	UNP P20839
G	0	SER	-	expression tag	UNP P20839
G	477	ASP	SER	engineered mutation	UNP P20839
G	510	THR	-	variant	UNP P20839
G	511	PHE	-	variant	UNP P20839
G	512	LEU	-	variant	UNP P20839
G	513	PRO	-	variant	UNP P20839
G	514	PHE	-	variant	UNP P20839
G	515	THR	-	variant	UNP P20839
G	516	LYS	-	variant	UNP P20839
G	517	SER	-	variant	UNP P20839
G	518	GLY	-	variant	UNP P20839
G	519	CYS	-	variant	UNP P20839
G	520	THR	-	variant	UNP P20839
G	521	GLU	-	variant	UNP P20839
G	522	ASP	-	variant	UNP P20839
G	523	SER	-	variant	UNP P20839
G	524	GLY	-	variant	UNP P20839
G	525	GLY	-	variant	UNP P20839
G	526	GLY	-	variant	UNP P20839
G	527	ARG	-	variant	UNP P20839
G	528	GLY	-	variant	UNP P20839
G	529	GLY	-	variant	UNP P20839
G	530	GLY	-	variant	UNP P20839
G	531	GLY	-	variant	UNP P20839
G	532	ASP	-	variant	UNP P20839

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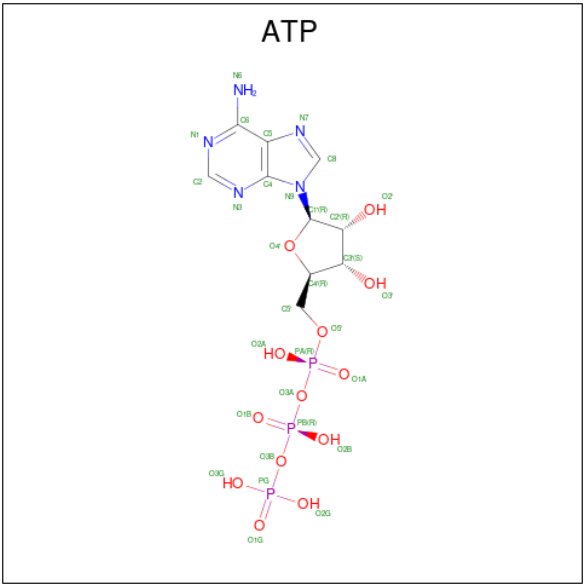
Chain	Residue	Modelled	Actual	Comment	Reference
G	533	ALA	-	variant	UNP P20839
G	534	PRO	-	variant	UNP P20839
G	535	GLN	-	variant	UNP P20839
G	536	CYS	-	variant	UNP P20839
G	537	PRO	-	variant	UNP P20839
G	538	LEU	-	variant	UNP P20839
G	539	LEU	-	variant	UNP P20839
G	540	GLY	-	variant	UNP P20839
G	541	THR	-	variant	UNP P20839
G	542	ALA	-	variant	UNP P20839
G	543	SER	-	variant	UNP P20839
G	544	LEU	-	variant	UNP P20839
G	545	HIS	-	variant	UNP P20839
G	546	ASN	-	variant	UNP P20839
H	-1	GLY	-	expression tag	UNP P20839
H	0	SER	-	expression tag	UNP P20839
H	477	ASP	SER	engineered mutation	UNP P20839
H	510	THR	-	variant	UNP P20839
H	511	PHE	-	variant	UNP P20839
H	512	LEU	-	variant	UNP P20839
H	513	PRO	-	variant	UNP P20839
H	514	PHE	-	variant	UNP P20839
H	515	THR	-	variant	UNP P20839
H	516	LYS	-	variant	UNP P20839
H	517	SER	-	variant	UNP P20839
H	518	GLY	-	variant	UNP P20839
H	519	CYS	-	variant	UNP P20839
H	520	THR	-	variant	UNP P20839
H	521	GLU	-	variant	UNP P20839
H	522	ASP	-	variant	UNP P20839
H	523	SER	-	variant	UNP P20839
H	524	GLY	-	variant	UNP P20839
H	525	GLY	-	variant	UNP P20839
H	526	GLY	-	variant	UNP P20839
H	527	ARG	-	variant	UNP P20839
H	528	GLY	-	variant	UNP P20839
H	529	GLY	-	variant	UNP P20839
H	530	GLY	-	variant	UNP P20839
H	531	GLY	-	variant	UNP P20839
H	532	ASP	-	variant	UNP P20839
H	533	ALA	-	variant	UNP P20839
H	534	PRO	-	variant	UNP P20839

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Chain	Residue	Modelled	Actual	Comment	Reference
H	535	GLN	-	variant	UNP P20839
H	536	CYS	-	variant	UNP P20839
H	537	PRO	-	variant	UNP P20839
H	538	LEU	-	variant	UNP P20839
H	539	LEU	-	variant	UNP P20839
H	540	GLY	-	variant	UNP P20839
H	541	THR	-	variant	UNP P20839
H	542	ALA	-	variant	UNP P20839
H	543	SER	-	variant	UNP P20839
H	544	LEU	-	variant	UNP P20839
H	545	HIS	-	variant	UNP P20839
H	546	ASN	-	variant	UNP P20839

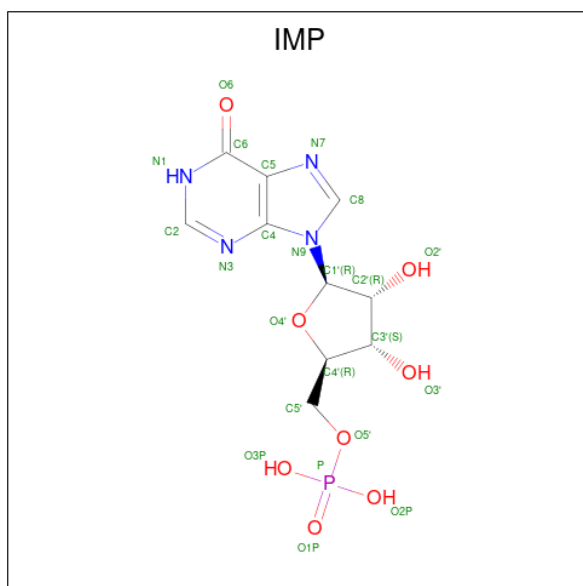
- Molecule 2 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: C₁₀H₁₆N₅O₁₃P₃) (labeled as "Ligand of Interest" by depositor).



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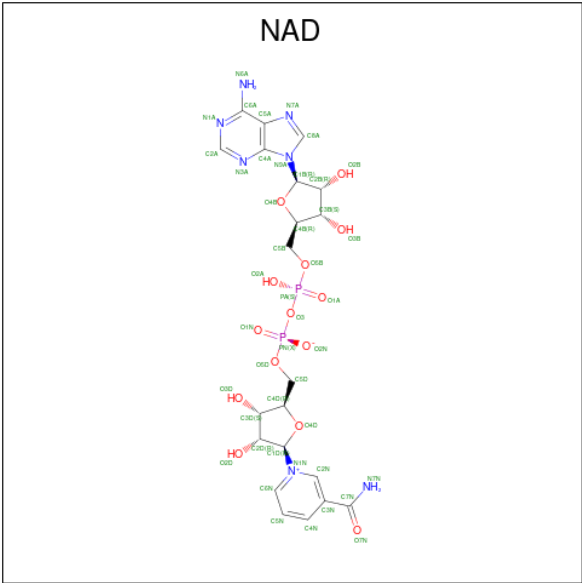
Mol	Chain	Residues	Atoms					AltConf
2	C	1	Total	C	N	O	P	0
			31	10	5	13	3	
2	D	1	Total	C	N	O	P	0
			31	10	5	13	3	
2	D	1	Total	C	N	O	P	0
			31	10	5	13	3	
2	E	1	Total	C	N	O	P	0
			31	10	5	13	3	
2	E	1	Total	C	N	O	P	0
			31	10	5	13	3	
2	F	1	Total	C	N	O	P	0
			31	10	5	13	3	
2	F	1	Total	C	N	O	P	0
			31	10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

- Molecule 3 is INOSINIC ACID (CCD ID: IMP) (formula: $C_{10}H_{13}N_4O_8P$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
3	A	1	Total	C	N	O	P	0
			23	10	4	8	1	
3	B	1	Total	C	N	O	P	0
			23	10	4	8	1	
3	C	1	Total	C	N	O	P	0
			23	10	4	8	1	
3	D	1	Total	C	N	O	P	0
			23	10	4	8	1	
3	E	1	Total	C	N	O	P	0
			23	10	4	8	1	
3	F	1	Total	C	N	O	P	0
			23	10	4	8	1	
3	G	1	Total	C	N	O	P	0
			23	10	4	8	1	
3	H	1	Total	C	N	O	P	0
			23	10	4	8	1	

- Molecule 4 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (CCD ID: NAD) (formula: $C_{21}H_{27}N_7O_{14}P_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
4	A	1	Total	C	N	O	P	0
			44	21	7	14	2	
4	B	1	Total	C	N	O	P	0
			44	21	7	14	2	
4	C	1	Total	C	N	O	P	0
			44	21	7	14	2	

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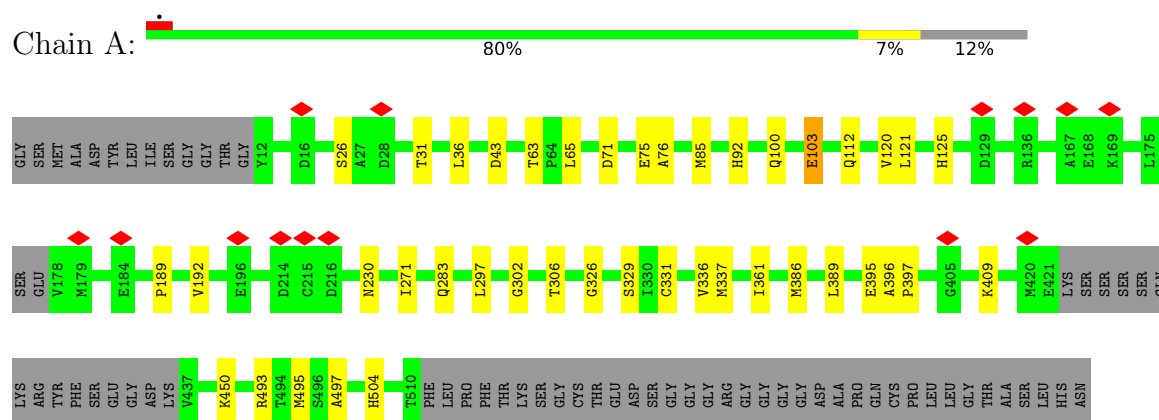
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Mol	Chain	Residues	Atoms					AltConf
4	D	1	Total 44	C 21	N 7	O 14	P 2	0
4	E	1	Total 44	C 21	N 7	O 14	P 2	0
4	F	1	Total 44	C 21	N 7	O 14	P 2	0
4	G	1	Total 44	C 21	N 7	O 14	P 2	0
4	H	1	Total 44	C 21	N 7	O 14	P 2	0

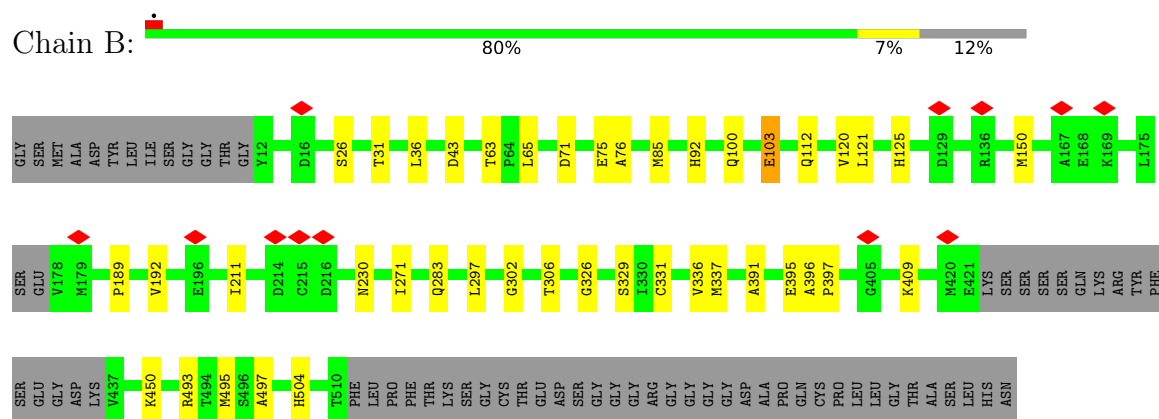
3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map 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 diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). 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.

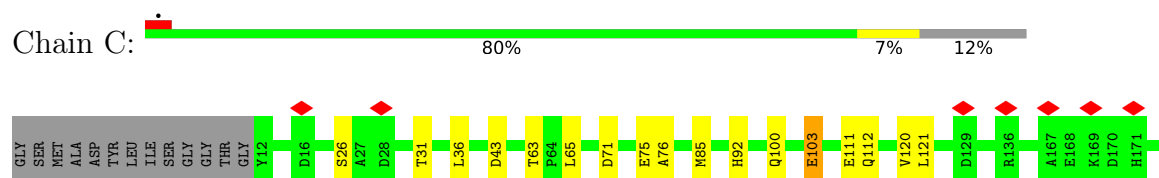
- Molecule 1: Inosine-5'-monophosphate dehydrogenase 1

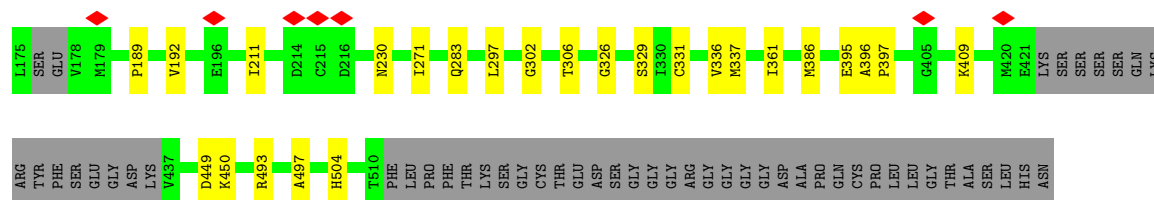


- Molecule 1: Inosine-5'-monophosphate dehydrogenase 1

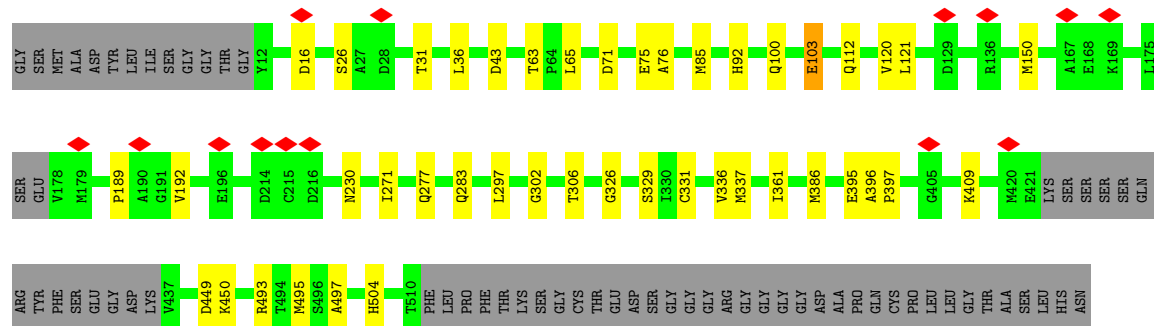
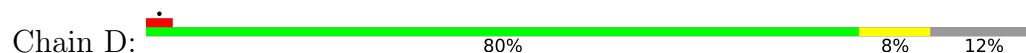


- Molecule 1: Inosine-5'-monophosphate dehydrogenase 1

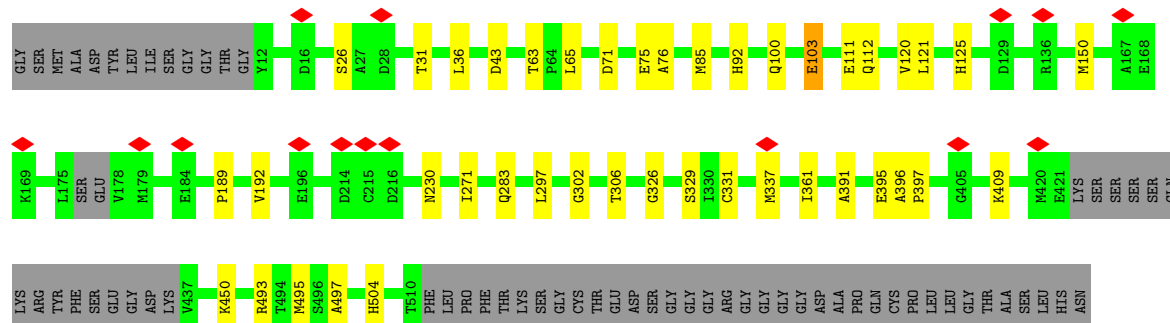
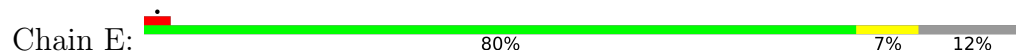




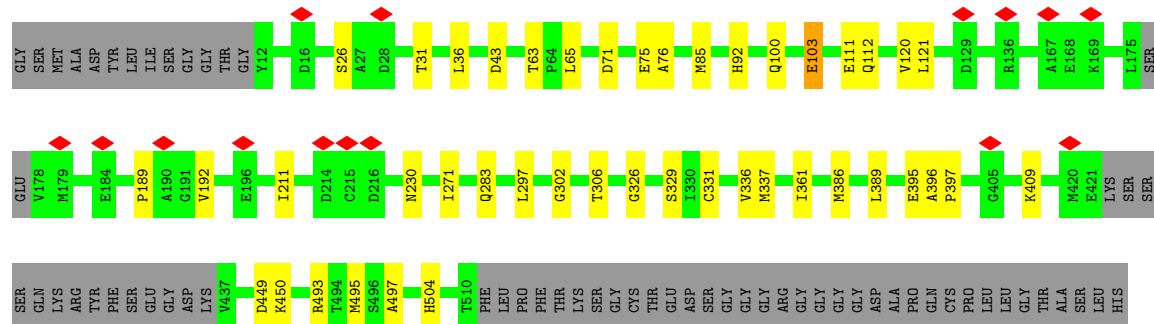
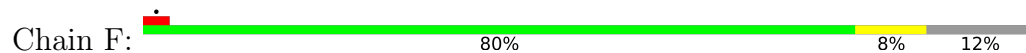
• Molecule 1: Inosine-5'-monophosphate dehydrogenase 1



• Molecule 1: Inosine-5'-monophosphate dehydrogenase 1

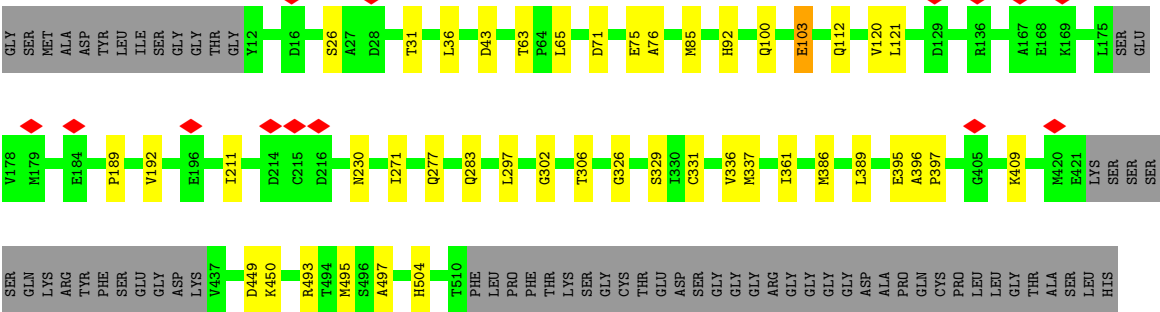
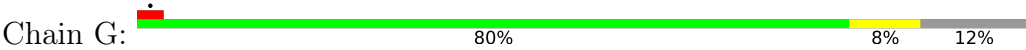


• Molecule 1: Inosine-5'-monophosphate dehydrogenase 1



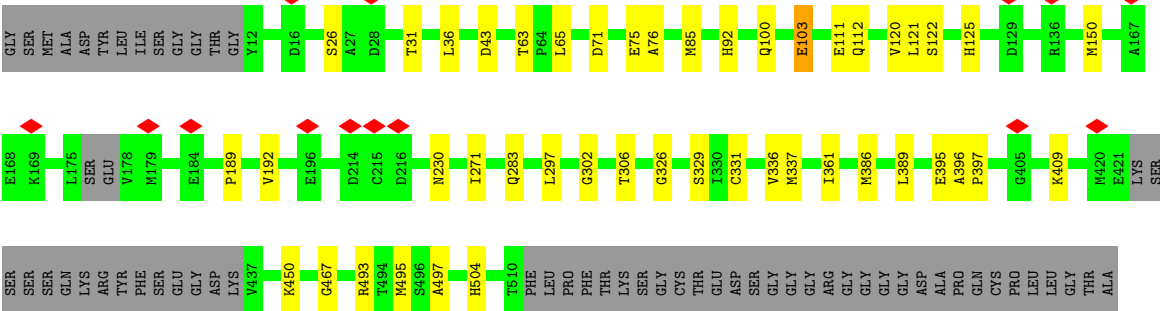
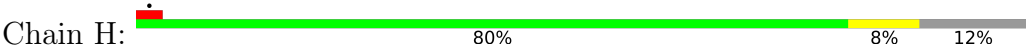
ASN

• Molecule 1: Inosine-5'-monophosphate dehydrogenase 1



ASN

• Molecule 1: Inosine-5'-monophosphate dehydrogenase 1



SER
LEU
HIS
ASN

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, D4	Depositor
Number of particles used	1773701	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	105000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	2.620	Depositor
Minimum map value	-0.005	Depositor
Average map value	0.008	Depositor
Map value standard deviation	0.074	Depositor
Recommended contour level	0.46	Depositor
Map size (Å)	337.2, 337.2, 337.2	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.84300005, 0.84300005, 0.84300005	Depositor

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: IMP, ATP, NAD

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	0.20	0/3685	0.38	0/4977
1	B	0.20	0/3685	0.38	0/4977
1	C	0.20	0/3685	0.38	0/4977
1	D	0.20	0/3685	0.38	0/4977
1	E	0.20	0/3685	0.38	0/4977
1	F	0.20	0/3685	0.38	0/4977
1	G	0.20	0/3685	0.38	0/4977
1	H	0.20	0/3685	0.38	0/4977
All	All	0.20	0/29480	0.38	0/39816

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3631	0	3699	31	0
1	B	3631	0	3699	30	0
1	C	3631	0	3699	28	0
1	D	3631	0	3699	29	0
1	E	3631	0	3699	29	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	F	3631	0	3699	30	0
1	G	3631	0	3699	29	0
1	H	3631	0	3699	33	0
2	A	62	0	24	0	0
2	B	62	0	24	0	0
2	C	62	0	24	0	0
2	D	62	0	24	0	0
2	E	62	0	24	0	0
2	F	62	0	24	0	0
2	G	62	0	24	0	0
2	H	62	0	24	0	0
3	A	23	0	11	1	0
3	B	23	0	11	1	0
3	C	23	0	11	1	0
3	D	23	0	11	1	0
3	E	23	0	11	1	0
3	F	23	0	11	1	0
3	G	23	0	11	1	0
3	H	23	0	11	1	0
4	A	44	0	26	0	0
4	B	44	0	26	0	0
4	C	44	0	26	0	0
4	D	44	0	26	0	0
4	E	44	0	26	0	0
4	F	44	0	26	0	0
4	G	44	0	26	0	0
4	H	44	0	26	0	0
All	All	30080	0	30080	220	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 4.

All (220) 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:A:336:VAL:HG12	1:A:337:MET:HE3	1.68	0.75
1:B:336:VAL:HG12	1:B:337:MET:HE3	1.67	0.75
1:F:336:VAL:HG12	1:F:337:MET:HE3	1.68	0.74
1:D:336:VAL:HG12	1:D:337:MET:HE3	1.68	0.74
1:G:336:VAL:HG12	1:G:337:MET:HE3	1.68	0.74
1:C:336:VAL:HG12	1:C:337:MET:HE3	1.68	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:336:VAL:HG12	1:H:337:MET:HE3	1.68	0.73
1:A:495:MET:HE2	1:A:495:MET:HA	1.71	0.70
1:G:396:ALA:O	1:G:409:LYS:NZ	2.26	0.69
1:E:396:ALA:O	1:E:409:LYS:NZ	2.26	0.68
1:E:495:MET:HA	1:E:495:MET:HE2	1.73	0.68
1:C:396:ALA:O	1:C:409:LYS:NZ	2.26	0.68
1:D:396:ALA:O	1:D:409:LYS:NZ	2.27	0.68
1:H:396:ALA:O	1:H:409:LYS:NZ	2.27	0.68
1:A:396:ALA:O	1:A:409:LYS:NZ	2.27	0.68
1:F:396:ALA:O	1:F:409:LYS:NZ	2.26	0.68
1:B:396:ALA:O	1:B:409:LYS:NZ	2.26	0.68
1:G:85:MET:HA	1:G:85:MET:HE2	1.78	0.66
1:D:495:MET:HE2	1:D:495:MET:HA	1.76	0.66
1:F:85:MET:HE2	1:F:85:MET:HA	1.79	0.64
1:C:85:MET:HE2	1:C:85:MET:HA	1.79	0.64
1:D:85:MET:HE2	1:D:85:MET:HA	1.79	0.62
1:D:283:GLN:OE1	1:D:302:GLY:N	2.30	0.62
1:B:85:MET:HA	1:B:85:MET:HE2	1.80	0.62
1:H:283:GLN:OE1	1:H:302:GLY:N	2.31	0.62
1:A:389:LEU:O	1:A:450:LYS:NZ	2.31	0.62
1:H:85:MET:HE2	1:H:85:MET:HA	1.80	0.61
1:A:85:MET:HE2	1:A:85:MET:HA	1.80	0.61
1:E:85:MET:HA	1:E:85:MET:HE2	1.80	0.61
1:H:389:LEU:O	1:H:450:LYS:NZ	2.31	0.60
1:D:331:CYS:SG	3:D:603:IMP:H2	2.42	0.59
1:H:331:CYS:SG	3:H:603:IMP:H2	2.42	0.59
1:C:331:CYS:SG	3:C:603:IMP:H2	2.42	0.59
1:G:283:GLN:OE1	1:G:302:GLY:N	2.31	0.59
1:C:283:GLN:OE1	1:C:302:GLY:N	2.30	0.59
1:G:331:CYS:SG	3:G:603:IMP:H2	2.42	0.59
1:A:331:CYS:SG	3:A:603:IMP:H2	2.42	0.59
1:E:331:CYS:SG	3:E:603:IMP:H2	2.42	0.59
1:F:331:CYS:SG	3:F:603:IMP:H2	2.42	0.58
1:B:331:CYS:SG	3:B:603:IMP:H2	2.42	0.58
1:D:76:ALA:HB2	1:D:103:GLU:HG3	1.86	0.57
1:H:76:ALA:HB2	1:H:103:GLU:HG3	1.86	0.57
1:A:76:ALA:HB2	1:A:103:GLU:HG3	1.86	0.57
1:B:76:ALA:HB2	1:B:103:GLU:HG3	1.87	0.57
1:D:189:PRO:O	1:D:192:VAL:HG23	2.05	0.57
1:E:76:ALA:HB2	1:E:103:GLU:HG3	1.87	0.57
1:G:189:PRO:O	1:G:192:VAL:HG23	2.05	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:189:PRO:O	1:H:192:VAL:HG23	2.05	0.57
1:E:283:GLN:OE1	1:E:302:GLY:N	2.31	0.57
1:F:283:GLN:OE1	1:F:302:GLY:N	2.30	0.57
1:A:189:PRO:O	1:A:192:VAL:HG23	2.05	0.57
1:C:189:PRO:O	1:C:192:VAL:HG23	2.05	0.57
1:E:189:PRO:O	1:E:192:VAL:HG23	2.05	0.57
1:F:76:ALA:HB2	1:F:103:GLU:HG3	1.87	0.57
1:A:283:GLN:OE1	1:A:302:GLY:N	2.31	0.56
1:G:76:ALA:HB2	1:G:103:GLU:HG3	1.87	0.56
1:B:189:PRO:O	1:B:192:VAL:HG23	2.05	0.56
1:F:189:PRO:O	1:F:192:VAL:HG23	2.05	0.56
1:C:76:ALA:HB2	1:C:103:GLU:HG3	1.87	0.56
1:B:283:GLN:OE1	1:B:302:GLY:N	2.31	0.56
1:A:497:ALA:HA	1:B:31:THR:HG21	1.89	0.55
1:F:497:ALA:HA	1:G:31:THR:HG21	1.89	0.55
1:E:497:ALA:HA	1:F:31:THR:HG21	1.89	0.55
1:A:31:THR:HG21	1:D:497:ALA:HA	1.89	0.55
1:B:497:ALA:HA	1:C:31:THR:HG21	1.89	0.55
1:E:495:MET:HG2	1:F:495:MET:HE1	1.88	0.54
1:F:389:LEU:O	1:F:450:LYS:HE3	2.07	0.54
1:G:497:ALA:HA	1:H:31:THR:HG21	1.90	0.54
1:C:497:ALA:HA	1:D:31:THR:HG21	1.90	0.54
1:E:31:THR:HG21	1:H:497:ALA:HA	1.90	0.53
1:B:112:GLN:NE2	1:B:230:ASN:OD1	2.44	0.51
1:C:336:VAL:HG12	1:C:337:MET:CE	2.40	0.51
1:F:112:GLN:NE2	1:F:230:ASN:OD1	2.45	0.50
1:G:336:VAL:HG12	1:G:337:MET:CE	2.40	0.50
1:A:121:LEU:HD22	1:A:125:HIS:CD2	2.47	0.50
1:B:336:VAL:HG12	1:B:337:MET:CE	2.40	0.50
1:G:395:GLU:OE2	1:G:395:GLU:N	2.40	0.50
1:A:336:VAL:HG12	1:A:337:MET:CE	2.40	0.50
1:E:121:LEU:HD22	1:E:125:HIS:CD2	2.47	0.50
1:H:121:LEU:HD22	1:H:125:HIS:CD2	2.47	0.50
1:F:395:GLU:OE2	1:F:395:GLU:N	2.42	0.50
1:G:112:GLN:NE2	1:G:230:ASN:OD1	2.44	0.50
1:B:121:LEU:HD22	1:B:125:HIS:CD2	2.47	0.50
1:F:336:VAL:HG12	1:F:337:MET:CE	2.40	0.50
1:H:112:GLN:NE2	1:H:230:ASN:OD1	2.45	0.50
1:B:395:GLU:OE2	1:B:395:GLU:N	2.42	0.49
1:C:112:GLN:NE2	1:C:230:ASN:OD1	2.45	0.49
1:D:112:GLN:NE2	1:D:230:ASN:OD1	2.45	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:63:THR:CG2	1:G:65:LEU:HD23	2.42	0.49
1:A:112:GLN:NE2	1:A:230:ASN:OD1	2.45	0.49
1:C:395:GLU:OE2	1:C:395:GLU:N	2.41	0.49
1:B:63:THR:CG2	1:B:65:LEU:HD23	2.42	0.49
1:E:112:GLN:NE2	1:E:230:ASN:OD1	2.46	0.49
1:E:395:GLU:OE2	1:E:395:GLU:N	2.42	0.49
1:D:71:ASP:HA	1:D:92:HIS:ND1	2.28	0.49
1:F:43:ASP:N	1:F:43:ASP:OD2	2.46	0.49
1:F:71:ASP:HA	1:F:92:HIS:ND1	2.28	0.49
1:B:43:ASP:OD2	1:B:43:ASP:N	2.46	0.48
1:H:71:ASP:HA	1:H:92:HIS:ND1	2.28	0.48
1:A:395:GLU:OE2	1:A:395:GLU:N	2.43	0.48
1:E:391:ALA:O	1:E:450:LYS:NZ	2.30	0.48
1:A:389:LEU:C	1:A:450:LYS:HZ1	2.16	0.48
1:B:71:ASP:HA	1:B:92:HIS:ND1	2.28	0.48
1:E:71:ASP:HA	1:E:92:HIS:ND1	2.28	0.48
1:C:71:ASP:HA	1:C:92:HIS:ND1	2.28	0.48
1:A:71:ASP:HA	1:A:92:HIS:ND1	2.29	0.48
1:E:63:THR:CG2	1:E:65:LEU:HD23	2.43	0.48
1:G:71:ASP:HA	1:G:92:HIS:ND1	2.28	0.48
1:D:43:ASP:OD2	1:D:43:ASP:N	2.46	0.47
1:H:43:ASP:OD2	1:H:43:ASP:N	2.46	0.47
1:C:63:THR:CG2	1:C:65:LEU:HD23	2.44	0.47
1:D:336:VAL:HG12	1:D:337:MET:CE	2.40	0.47
1:G:43:ASP:OD2	1:G:43:ASP:N	2.46	0.47
1:A:326:GLY:HA2	1:A:331:CYS:SG	2.55	0.47
1:C:43:ASP:OD2	1:C:43:ASP:N	2.46	0.47
1:D:326:GLY:HA2	1:D:331:CYS:SG	2.55	0.47
1:E:43:ASP:OD2	1:E:43:ASP:N	2.46	0.47
1:F:63:THR:CG2	1:F:65:LEU:HD23	2.45	0.47
1:H:336:VAL:HG12	1:H:337:MET:CE	2.40	0.47
1:A:43:ASP:N	1:A:43:ASP:OD2	2.46	0.47
1:E:326:GLY:HA2	1:E:331:CYS:SG	2.55	0.47
1:H:326:GLY:HA2	1:H:331:CYS:SG	2.55	0.47
1:D:395:GLU:OE2	1:D:395:GLU:N	2.41	0.46
1:G:449:ASP:OD1	1:G:450:LYS:N	2.49	0.46
1:C:326:GLY:HA2	1:C:331:CYS:SG	2.55	0.46
1:C:386:MET:HE3	1:C:386:MET:HB2	1.90	0.46
1:G:326:GLY:HA2	1:G:331:CYS:SG	2.55	0.46
1:B:326:GLY:HA2	1:B:331:CYS:SG	2.55	0.46
1:H:389:LEU:C	1:H:450:LYS:HZ3	2.21	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:92:HIS:O	1:C:100:GLN:NE2	2.50	0.45
1:D:63:THR:CG2	1:D:65:LEU:HD23	2.45	0.45
1:D:92:HIS:O	1:D:100:GLN:NE2	2.50	0.45
1:E:92:HIS:O	1:E:100:GLN:NE2	2.49	0.45
1:G:92:HIS:O	1:G:100:GLN:NE2	2.50	0.45
1:H:395:GLU:OE2	1:H:395:GLU:N	2.42	0.45
1:F:326:GLY:HA2	1:F:331:CYS:SG	2.55	0.45
1:G:85:MET:HE2	1:G:85:MET:CA	2.47	0.45
1:G:389:LEU:O	1:G:450:LYS:HE3	2.17	0.45
1:H:92:HIS:O	1:H:100:GLN:NE2	2.50	0.45
1:E:36:LEU:HG	1:E:493:ARG:HD3	1.99	0.45
1:A:92:HIS:O	1:A:100:GLN:NE2	2.50	0.44
1:C:120:VAL:HG12	1:C:121:LEU:N	2.32	0.44
1:F:63:THR:HG22	1:F:65:LEU:H	1.81	0.44
1:F:120:VAL:HG12	1:F:121:LEU:N	2.32	0.44
1:G:120:VAL:HG12	1:G:121:LEU:N	2.32	0.44
1:A:63:THR:CG2	1:A:65:LEU:HD23	2.47	0.44
1:E:63:THR:HG22	1:E:65:LEU:H	1.83	0.44
1:H:63:THR:CG2	1:H:65:LEU:HD23	2.47	0.44
1:D:120:VAL:HG12	1:D:121:LEU:N	2.32	0.44
1:C:63:THR:HG22	1:C:65:LEU:H	1.82	0.43
1:D:63:THR:HG22	1:D:65:LEU:H	1.83	0.43
1:A:36:LEU:HG	1:A:493:ARG:HD3	2.01	0.43
1:A:63:THR:HG22	1:A:65:LEU:H	1.83	0.43
1:C:271:ILE:HG13	1:C:297:LEU:HD21	2.00	0.43
1:H:63:THR:HG22	1:H:65:LEU:H	1.83	0.43
1:B:504:HIS:O	1:C:329:SER:HB2	2.19	0.43
1:A:504:HIS:O	1:B:329:SER:HB2	2.18	0.43
1:F:504:HIS:O	1:G:329:SER:HB2	2.19	0.43
1:G:271:ILE:HG13	1:G:297:LEU:HD21	2.01	0.43
1:B:120:VAL:HG12	1:B:121:LEU:N	2.33	0.43
1:D:36:LEU:HG	1:D:493:ARG:HD3	2.00	0.43
1:G:63:THR:HG22	1:G:65:LEU:H	1.83	0.43
1:G:504:HIS:O	1:H:329:SER:HB2	2.19	0.43
1:H:120:VAL:HG12	1:H:121:LEU:N	2.33	0.43
1:C:85:MET:HE2	1:C:85:MET:CA	2.49	0.43
1:C:504:HIS:O	1:D:329:SER:HB2	2.19	0.43
1:D:271:ILE:HG13	1:D:297:LEU:HD21	2.01	0.43
1:E:504:HIS:O	1:F:329:SER:HB2	2.19	0.43
1:F:85:MET:HE2	1:F:85:MET:CA	2.48	0.43
1:B:63:THR:HG22	1:B:65:LEU:H	1.83	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:120:VAL:HG12	1:E:121:LEU:N	2.33	0.43
1:F:449:ASP:OD1	1:F:450:LYS:N	2.52	0.43
1:G:386:MET:HE3	1:G:386:MET:HB2	1.96	0.43
1:B:271:ILE:HG13	1:B:297:LEU:HD21	2.00	0.42
1:H:271:ILE:HG13	1:H:297:LEU:HD21	2.01	0.42
1:A:75:GLU:HG3	1:A:397:PRO:HB3	2.01	0.42
1:F:92:HIS:O	1:F:100:GLN:NE2	2.52	0.42
1:H:495:MET:H	1:H:495:MET:HG2	1.69	0.42
1:A:120:VAL:HG12	1:A:121:LEU:N	2.33	0.42
1:C:36:LEU:HG	1:C:493:ARG:HD3	2.00	0.42
1:E:75:GLU:HG3	1:E:397:PRO:HB3	2.01	0.42
1:B:36:LEU:HG	1:B:493:ARG:HD3	2.01	0.42
1:B:75:GLU:HG3	1:B:397:PRO:HB3	2.01	0.42
1:F:75:GLU:HG3	1:F:397:PRO:HB3	2.01	0.42
1:F:271:ILE:HG13	1:F:297:LEU:HD21	2.01	0.42
1:G:75:GLU:HG3	1:G:397:PRO:HB3	2.01	0.42
1:H:36:LEU:HG	1:H:493:ARG:HD3	2.01	0.42
1:A:386:MET:HE3	1:A:386:MET:HB2	1.96	0.42
1:G:36:LEU:HG	1:G:493:ARG:HD3	2.00	0.42
1:H:386:MET:HE3	1:H:386:MET:HB2	1.96	0.42
1:C:75:GLU:HG3	1:C:397:PRO:HB3	2.01	0.42
1:D:386:MET:HE3	1:D:386:MET:HB2	1.96	0.42
1:E:329:SER:HB2	1:H:504:HIS:O	2.18	0.42
1:B:92:HIS:O	1:B:100:GLN:NE2	2.53	0.42
1:F:36:LEU:HG	1:F:493:ARG:HD3	2.01	0.42
1:E:271:ILE:HG13	1:E:297:LEU:HD21	2.00	0.42
1:A:329:SER:HB2	1:D:504:HIS:O	2.19	0.41
1:H:75:GLU:HG3	1:H:397:PRO:HB3	2.01	0.41
1:A:271:ILE:HG13	1:A:297:LEU:HD21	2.01	0.41
1:D:75:GLU:HG3	1:D:397:PRO:HB3	2.01	0.41
1:D:85:MET:HE2	1:D:85:MET:CA	2.48	0.41
1:B:85:MET:HE2	1:B:85:MET:CA	2.49	0.41
1:E:337:MET:HG3	1:H:467:GLY:HA2	2.02	0.41
1:F:386:MET:HE3	1:F:386:MET:HB2	1.90	0.41
1:H:150:MET:HE3	1:H:150:MET:HB3	1.97	0.41
1:D:150:MET:HE3	1:D:150:MET:HB3	1.97	0.41
1:A:85:MET:HE2	1:A:85:MET:CA	2.49	0.41
1:E:85:MET:HE2	1:E:85:MET:CA	2.49	0.41
1:H:85:MET:HE2	1:H:85:MET:CA	2.49	0.41
1:F:192:VAL:HG21	1:F:211:ILE:HG12	2.03	0.41
1:H:122:SER:HG	1:H:125:HIS:CE1	2.38	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:192:VAL:HG21	1:B:211:ILE:HG12	2.03	0.41
1:G:192:VAL:HG21	1:G:211:ILE:HG12	2.03	0.41
1:B:150:MET:HE3	1:B:150:MET:HB3	1.93	0.40
1:C:192:VAL:HG21	1:C:211:ILE:HG12	2.03	0.40
1:B:391:ALA:O	1:B:450:LYS:NZ	2.30	0.40
1:D:449:ASP:OD1	1:D:450:LYS:N	2.54	0.40
1:E:150:MET:HE3	1:E:150:MET:HB3	1.92	0.40
1:C:449:ASP:OD1	1:C:450:LYS:N	2.54	0.40
1:A:495:MET:HG2	1:B:495:MET:HE1	2.02	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 PDB entries followed by that with respect to all EM entries.

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	476/548 (87%)	460 (97%)	16 (3%)	0	100	100
1	B	476/548 (87%)	460 (97%)	16 (3%)	0	100	100
1	C	476/548 (87%)	460 (97%)	16 (3%)	0	100	100
1	D	476/548 (87%)	460 (97%)	16 (3%)	0	100	100
1	E	476/548 (87%)	460 (97%)	16 (3%)	0	100	100
1	F	476/548 (87%)	460 (97%)	16 (3%)	0	100	100
1	G	476/548 (87%)	460 (97%)	16 (3%)	0	100	100
1	H	476/548 (87%)	460 (97%)	16 (3%)	0	100	100
All	All	3808/4384 (87%)	3680 (97%)	128 (3%)	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 PDB entries followed by that with respect to all EM entries.

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	392/441 (89%)	388 (99%)	4 (1%)	68	84
1	B	392/441 (89%)	389 (99%)	3 (1%)	73	86
1	C	392/441 (89%)	387 (99%)	5 (1%)	61	80
1	D	392/441 (89%)	386 (98%)	6 (2%)	57	77
1	E	392/441 (89%)	387 (99%)	5 (1%)	61	80
1	F	392/441 (89%)	387 (99%)	5 (1%)	61	80
1	G	392/441 (89%)	386 (98%)	6 (2%)	57	77
1	H	392/441 (89%)	387 (99%)	5 (1%)	61	80
All	All	3136/3528 (89%)	3097 (99%)	39 (1%)	61	81

All (39) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	26	SER
1	A	103	GLU
1	A	306	THR
1	A	361	ILE
1	B	26	SER
1	B	103	GLU
1	B	306	THR
1	C	26	SER
1	C	103	GLU
1	C	111	GLU
1	C	306	THR
1	C	361	ILE
1	D	16	ASP
1	D	26	SER
1	D	103	GLU
1	D	277	GLN
1	D	306	THR
1	D	361	ILE
1	E	26	SER

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Mol	Chain	Res	Type
1	E	103	GLU
1	E	111	GLU
1	E	306	THR
1	E	361	ILE
1	F	26	SER
1	F	103	GLU
1	F	111	GLU
1	F	306	THR
1	F	361	ILE
1	G	26	SER
1	G	103	GLU
1	G	277	GLN
1	G	306	THR
1	G	361	ILE
1	G	495	MET
1	H	26	SER
1	H	103	GLU
1	H	111	GLU
1	H	306	THR
1	H	361	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (28) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	112	GLN
1	A	137	HIS
1	A	292	GLN
1	B	112	GLN
1	B	137	HIS
1	C	92	HIS
1	C	112	GLN
1	C	137	HIS
1	C	303	ASN
1	C	368	GLN
1	D	92	HIS
1	D	112	GLN
1	D	137	HIS
1	D	292	GLN
1	D	368	GLN
1	E	112	GLN
1	E	137	HIS
1	F	112	GLN

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Mol	Chain	Res	Type
1	F	137	HIS
1	F	303	ASN
1	F	368	GLN
1	G	112	GLN
1	G	137	HIS
1	G	303	ASN
1	H	112	GLN
1	H	137	HIS
1	H	292	GLN
1	H	368	GLN

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 ⓘ

32 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
2	ATP	H	602	-	32,33,33	0.61	0	48,52,52	0.67	0
2	ATP	H	601	-	32,33,33	0.62	0	48,52,52	0.70	1 (2%)
3	IMP	G	603	-	25,25,25	2.69	7 (28%)	37,38,38	2.02	8 (21%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	IMP	B	603	-	25,25,25	2.69	7 (28%)	37,38,38	2.01	8 (21%)
4	NAD	B	604	-	46,48,48	0.68	1 (2%)	64,73,73	0.61	1 (1%)
2	ATP	F	601	-	32,33,33	0.61	0	48,52,52	0.70	1 (2%)
3	IMP	D	603	-	25,25,25	2.69	7 (28%)	37,38,38	2.02	8 (21%)
2	ATP	D	602	-	32,33,33	0.61	0	48,52,52	0.67	0
4	NAD	G	604	-	46,48,48	0.67	1 (2%)	64,73,73	0.61	1 (1%)
2	ATP	D	601	-	32,33,33	0.61	0	48,52,52	0.68	1 (2%)
4	NAD	D	604	-	46,48,48	0.67	1 (2%)	64,73,73	0.61	1 (1%)
3	IMP	F	603	-	25,25,25	2.69	7 (28%)	37,38,38	2.03	8 (21%)
4	NAD	F	604	-	46,48,48	0.67	1 (2%)	64,73,73	0.60	1 (1%)
3	IMP	E	603	-	25,25,25	2.68	7 (28%)	37,38,38	2.03	8 (21%)
3	IMP	A	603	-	25,25,25	2.68	7 (28%)	37,38,38	2.02	8 (21%)
4	NAD	A	604	-	46,48,48	0.67	1 (2%)	64,73,73	0.61	1 (1%)
2	ATP	F	602	-	32,33,33	0.61	0	48,52,52	0.67	0
2	ATP	E	602	-	32,33,33	0.61	0	48,52,52	0.66	0
2	ATP	E	601	-	32,33,33	0.62	0	48,52,52	0.70	1 (2%)
2	ATP	A	601	-	32,33,33	0.61	0	48,52,52	0.68	1 (2%)
2	ATP	A	602	-	32,33,33	0.60	0	48,52,52	0.66	0
4	NAD	E	604	-	46,48,48	0.67	1 (2%)	64,73,73	0.61	1 (1%)
2	ATP	G	601	-	32,33,33	0.61	0	48,52,52	0.70	1 (2%)
2	ATP	B	601	-	32,33,33	0.60	0	48,52,52	0.68	1 (2%)
3	IMP	C	603	-	25,25,25	2.69	7 (28%)	37,38,38	2.02	8 (21%)
2	ATP	C	602	-	32,33,33	0.61	0	48,52,52	0.66	0
2	ATP	G	602	-	32,33,33	0.61	0	48,52,52	0.66	0
2	ATP	B	602	-	32,33,33	0.61	0	48,52,52	0.66	0
2	ATP	C	601	-	32,33,33	0.61	0	48,52,52	0.68	1 (2%)
3	IMP	H	603	-	25,25,25	2.68	7 (28%)	37,38,38	2.03	8 (21%)
4	NAD	C	604	-	46,48,48	0.67	1 (2%)	64,73,73	0.61	1 (1%)
4	NAD	H	604	-	46,48,48	0.68	1 (2%)	64,73,73	0.61	1 (1%)

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	H	602	-	-	6/22/38/38	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	ATP	H	601	-	-	0/22/38/38	0/3/3/3
3	IMP	G	603	-	-	5/10/26/26	0/3/3/3
3	IMP	B	603	-	-	5/10/26/26	0/3/3/3
4	NAD	B	604	-	-	16/30/62/62	0/5/5/5
2	ATP	F	601	-	-	0/22/38/38	0/3/3/3
3	IMP	D	603	-	-	5/10/26/26	0/3/3/3
2	ATP	D	602	-	-	6/22/38/38	0/3/3/3
4	NAD	G	604	-	-	16/30/62/62	0/5/5/5
2	ATP	D	601	-	-	3/22/38/38	0/3/3/3
4	NAD	D	604	-	-	16/30/62/62	0/5/5/5
3	IMP	F	603	-	-	5/10/26/26	0/3/3/3
4	NAD	F	604	-	-	16/30/62/62	0/5/5/5
3	IMP	E	603	-	-	5/10/26/26	0/3/3/3
3	IMP	A	603	-	-	5/10/26/26	0/3/3/3
4	NAD	A	604	-	-	16/30/62/62	0/5/5/5
2	ATP	F	602	-	-	6/22/38/38	0/3/3/3
2	ATP	E	602	-	-	6/22/38/38	0/3/3/3
2	ATP	E	601	-	-	0/22/38/38	0/3/3/3
2	ATP	A	601	-	-	3/22/38/38	0/3/3/3
2	ATP	A	602	-	-	6/22/38/38	0/3/3/3
4	NAD	E	604	-	-	16/30/62/62	0/5/5/5
2	ATP	G	601	-	-	0/22/38/38	0/3/3/3
2	ATP	B	601	-	-	3/22/38/38	0/3/3/3
3	IMP	C	603	-	-	5/10/26/26	0/3/3/3
2	ATP	C	602	-	-	6/22/38/38	0/3/3/3
2	ATP	G	602	-	-	6/22/38/38	0/3/3/3
2	ATP	B	602	-	-	6/22/38/38	0/3/3/3
2	ATP	C	601	-	-	3/22/38/38	0/3/3/3
3	IMP	H	603	-	-	5/10/26/26	0/3/3/3
4	NAD	C	604	-	-	16/30/62/62	0/5/5/5
4	NAD	H	604	-	-	16/30/62/62	0/5/5/5

All (64) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	F	603	IMP	C2-N3	8.95	1.46	1.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	603	IMP	C2-N3	8.93	1.46	1.30
3	G	603	IMP	C2-N3	8.93	1.46	1.30
3	C	603	IMP	C2-N3	8.91	1.45	1.30
3	D	603	IMP	C2-N3	8.91	1.45	1.30
3	A	603	IMP	C2-N3	8.89	1.45	1.30
3	E	603	IMP	C2-N3	8.89	1.45	1.30
3	H	603	IMP	C2-N3	8.89	1.45	1.30
3	C	603	IMP	C4-N3	6.59	1.49	1.35
3	E	603	IMP	C4-N3	6.57	1.49	1.35
3	B	603	IMP	C4-N3	6.55	1.49	1.35
3	F	603	IMP	C4-N3	6.55	1.49	1.35
3	G	603	IMP	C4-N3	6.54	1.49	1.35
3	A	603	IMP	C4-N3	6.52	1.49	1.35
3	D	603	IMP	C4-N3	6.52	1.49	1.35
3	H	603	IMP	C4-N3	6.52	1.49	1.35
3	F	603	IMP	C2-N1	4.68	1.43	1.35
3	G	603	IMP	C2-N1	4.68	1.43	1.35
3	A	603	IMP	C2-N1	4.67	1.43	1.35
3	C	603	IMP	C2-N1	4.67	1.43	1.35
3	D	603	IMP	C2-N1	4.67	1.43	1.35
3	E	603	IMP	C2-N1	4.67	1.43	1.35
3	B	603	IMP	C2-N1	4.64	1.43	1.35
3	H	603	IMP	C2-N1	4.64	1.43	1.35
3	A	603	IMP	C5-N7	-2.97	1.33	1.39
3	E	603	IMP	C5-N7	-2.97	1.33	1.39
3	H	603	IMP	C5-N7	-2.96	1.33	1.39
3	C	603	IMP	C5-N7	-2.92	1.33	1.39
3	D	603	IMP	C5-N7	-2.92	1.33	1.39
3	G	603	IMP	C5-N7	-2.92	1.33	1.39
3	B	603	IMP	C5-N7	-2.91	1.33	1.39
3	F	603	IMP	C5-N7	-2.89	1.33	1.39
3	B	603	IMP	O6-C6	-2.89	1.18	1.23
3	D	603	IMP	O6-C6	-2.88	1.18	1.23
3	H	603	IMP	O6-C6	-2.88	1.18	1.23
3	G	603	IMP	O6-C6	-2.87	1.18	1.23
3	A	603	IMP	O6-C6	-2.86	1.18	1.23
3	F	603	IMP	O6-C6	-2.86	1.18	1.23
3	E	603	IMP	O6-C6	-2.83	1.18	1.23
3	C	603	IMP	O6-C6	-2.81	1.18	1.23
4	A	604	NAD	C2N-N1N	2.80	1.38	1.35
4	D	604	NAD	C2N-N1N	2.79	1.38	1.35
4	F	604	NAD	C2N-N1N	2.79	1.38	1.35

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	G	604	NAD	C2N-N1N	2.79	1.38	1.35
4	H	604	NAD	C2N-N1N	2.79	1.38	1.35
4	B	604	NAD	C2N-N1N	2.73	1.38	1.35
4	C	604	NAD	C2N-N1N	2.73	1.38	1.35
4	E	604	NAD	C2N-N1N	2.73	1.38	1.35
3	A	603	IMP	C5-C6	2.53	1.53	1.44
3	H	603	IMP	C5-C6	2.53	1.53	1.44
3	D	603	IMP	C5-C6	2.52	1.53	1.44
3	E	603	IMP	C5-C6	2.52	1.53	1.44
3	G	603	IMP	C5-C6	2.52	1.53	1.44
3	C	603	IMP	C5-C6	2.51	1.53	1.44
3	F	603	IMP	C5-C6	2.51	1.53	1.44
3	B	603	IMP	C5-C6	2.50	1.53	1.44
3	A	603	IMP	C4-N9	-2.20	1.32	1.38
3	D	603	IMP	C4-N9	-2.20	1.32	1.38
3	E	603	IMP	C4-N9	-2.20	1.32	1.38
3	G	603	IMP	C4-N9	-2.20	1.32	1.38
3	B	603	IMP	C4-N9	-2.20	1.32	1.38
3	C	603	IMP	C4-N9	-2.20	1.32	1.38
3	F	603	IMP	C4-N9	-2.20	1.32	1.38
3	H	603	IMP	C4-N9	-2.17	1.32	1.38

All (80) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	E	603	IMP	C5-C6-N1	6.21	119.70	110.78
3	A	603	IMP	C5-C6-N1	6.19	119.67	110.78
3	C	603	IMP	C5-C6-N1	6.18	119.67	110.78
3	D	603	IMP	C5-C6-N1	6.17	119.66	110.78
3	H	603	IMP	C5-C6-N1	6.17	119.65	110.78
3	F	603	IMP	C5-C6-N1	6.16	119.64	110.78
3	G	603	IMP	C5-C6-N1	6.16	119.64	110.78
3	B	603	IMP	C5-C6-N1	6.12	119.58	110.78
3	G	603	IMP	C2-N3-C4	4.47	119.39	111.53
3	A	603	IMP	C2-N3-C4	4.46	119.38	111.53
3	H	603	IMP	C2-N3-C4	4.46	119.38	111.53
3	E	603	IMP	C2-N3-C4	4.46	119.37	111.53
3	F	603	IMP	C2-N3-C4	4.46	119.37	111.53
3	D	603	IMP	C2-N3-C4	4.45	119.35	111.53
3	B	603	IMP	C2-N3-C4	4.43	119.32	111.53
3	C	603	IMP	C2-N3-C4	4.43	119.32	111.53
3	G	603	IMP	C5-C4-N3	-4.42	120.76	127.27

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	F	603	IMP	C5-C4-N3	-4.42	120.76	127.27
3	E	603	IMP	C5-C4-N3	-4.42	120.77	127.27
3	C	603	IMP	C5-C4-N3	-4.40	120.79	127.27
3	A	603	IMP	C5-C4-N3	-4.40	120.80	127.27
3	D	603	IMP	C5-C4-N3	-4.40	120.80	127.27
3	H	603	IMP	C5-C4-N3	-4.40	120.80	127.27
3	B	603	IMP	C5-C4-N3	-4.39	120.80	127.27
3	G	603	IMP	N1-C2-N3	-4.35	120.49	125.50
3	F	603	IMP	N1-C2-N3	-4.34	120.50	125.50
3	H	603	IMP	N1-C2-N3	-4.34	120.50	125.50
3	B	603	IMP	N1-C2-N3	-4.33	120.52	125.50
3	A	603	IMP	N1-C2-N3	-4.32	120.52	125.50
3	E	603	IMP	N1-C2-N3	-4.32	120.52	125.50
3	C	603	IMP	N1-C2-N3	-4.30	120.55	125.50
3	D	603	IMP	N1-C2-N3	-4.30	120.55	125.50
3	C	603	IMP	C2-N1-C6	-3.69	120.04	125.09
3	D	603	IMP	C2-N1-C6	-3.69	120.04	125.09
3	F	603	IMP	C2-N1-C6	-3.68	120.05	125.09
3	A	603	IMP	C2-N1-C6	-3.67	120.05	125.09
3	E	603	IMP	C2-N1-C6	-3.67	120.05	125.09
3	G	603	IMP	C2-N1-C6	-3.66	120.08	125.09
3	H	603	IMP	C2-N1-C6	-3.65	120.09	125.09
3	B	603	IMP	C2-N1-C6	-3.64	120.10	125.09
3	B	603	IMP	N9-C8-N7	-3.29	107.30	113.40
3	A	603	IMP	N9-C8-N7	-3.29	107.30	113.40
3	C	603	IMP	N9-C8-N7	-3.29	107.30	113.40
3	H	603	IMP	N9-C8-N7	-3.27	107.33	113.40
3	D	603	IMP	N9-C8-N7	-3.26	107.35	113.40
3	F	603	IMP	N9-C8-N7	-3.26	107.35	113.40
3	G	603	IMP	N9-C8-N7	-3.26	107.35	113.40
3	E	603	IMP	N9-C8-N7	-3.26	107.36	113.40
4	B	604	NAD	C6N-N1N-C2N	-2.51	119.75	121.88
4	D	604	NAD	C6N-N1N-C2N	-2.50	119.75	121.88
4	G	604	NAD	C6N-N1N-C2N	-2.50	119.75	121.88
4	F	604	NAD	C6N-N1N-C2N	-2.48	119.77	121.88
4	H	604	NAD	C6N-N1N-C2N	-2.48	119.77	121.88
4	C	604	NAD	C6N-N1N-C2N	-2.47	119.77	121.88
4	A	604	NAD	C6N-N1N-C2N	-2.43	119.81	121.88
4	E	604	NAD	C6N-N1N-C2N	-2.42	119.82	121.88
3	B	603	IMP	C8-N7-C5	2.41	108.56	104.26
3	H	603	IMP	C8-N7-C5	2.41	108.55	104.26
3	C	603	IMP	C8-N7-C5	2.40	108.53	104.26

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	F	603	IMP	C8-N7-C5	2.40	108.53	104.26
3	E	603	IMP	C8-N7-C5	2.40	108.53	104.26
3	A	603	IMP	C8-N7-C5	2.39	108.52	104.26
3	G	603	IMP	C8-N7-C5	2.38	108.50	104.26
3	D	603	IMP	C8-N7-C5	2.36	108.47	104.26
2	D	601	ATP	O2A-PA-O3A	2.20	113.23	107.27
2	B	601	ATP	O2A-PA-O3A	2.19	113.20	107.27
2	C	601	ATP	O2A-PA-O3A	2.19	113.20	107.27
3	H	603	IMP	N9-C4-N3	2.19	131.89	126.90
3	G	603	IMP	N9-C4-N3	2.19	131.89	126.90
2	A	601	ATP	O2A-PA-O3A	2.19	113.18	107.27
3	A	603	IMP	N9-C4-N3	2.18	131.88	126.90
3	D	603	IMP	N9-C4-N3	2.18	131.88	126.90
3	E	603	IMP	N9-C4-N3	2.18	131.87	126.90
2	G	601	ATP	O2A-PA-O3A	2.17	113.13	107.27
2	H	601	ATP	O2A-PA-O3A	2.16	113.12	107.27
3	C	603	IMP	N9-C4-N3	2.15	131.81	126.90
2	E	601	ATP	O2A-PA-O3A	2.15	113.08	107.27
2	F	601	ATP	O2A-PA-O3A	2.15	113.08	107.27
3	B	603	IMP	N9-C4-N3	2.15	131.79	126.90
3	F	603	IMP	N9-C4-N3	2.15	131.79	126.90

There are no chirality outliers.

All (228) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	602	ATP	C5'-O5'-PA-O2A
2	A	602	ATP	C5'-O5'-PA-O3A
2	B	602	ATP	C5'-O5'-PA-O2A
2	B	602	ATP	C5'-O5'-PA-O3A
2	C	602	ATP	C5'-O5'-PA-O2A
2	C	602	ATP	C5'-O5'-PA-O3A
2	D	602	ATP	C5'-O5'-PA-O2A
2	D	602	ATP	C5'-O5'-PA-O3A
2	E	602	ATP	C5'-O5'-PA-O2A
2	E	602	ATP	C5'-O5'-PA-O3A
2	F	602	ATP	C5'-O5'-PA-O2A
2	F	602	ATP	C5'-O5'-PA-O3A
2	G	602	ATP	C5'-O5'-PA-O2A
2	G	602	ATP	C5'-O5'-PA-O3A
2	H	602	ATP	C5'-O5'-PA-O2A
2	H	602	ATP	C5'-O5'-PA-O3A

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Mol	Chain	Res	Type	Atoms
3	A	603	IMP	C5'-O5'-P-O1P
3	A	603	IMP	C5'-O5'-P-O2P
3	A	603	IMP	C5'-O5'-P-O3P
3	B	603	IMP	C5'-O5'-P-O1P
3	B	603	IMP	C5'-O5'-P-O2P
3	B	603	IMP	C5'-O5'-P-O3P
3	C	603	IMP	C5'-O5'-P-O1P
3	C	603	IMP	C5'-O5'-P-O2P
3	C	603	IMP	C5'-O5'-P-O3P
3	D	603	IMP	C5'-O5'-P-O1P
3	D	603	IMP	C5'-O5'-P-O2P
3	D	603	IMP	C5'-O5'-P-O3P
3	E	603	IMP	C5'-O5'-P-O1P
3	E	603	IMP	C5'-O5'-P-O2P
3	E	603	IMP	C5'-O5'-P-O3P
3	F	603	IMP	C5'-O5'-P-O1P
3	F	603	IMP	C5'-O5'-P-O2P
3	F	603	IMP	C5'-O5'-P-O3P
3	G	603	IMP	C5'-O5'-P-O1P
3	G	603	IMP	C5'-O5'-P-O2P
3	G	603	IMP	C5'-O5'-P-O3P
3	H	603	IMP	C5'-O5'-P-O1P
3	H	603	IMP	C5'-O5'-P-O2P
3	H	603	IMP	C5'-O5'-P-O3P
4	A	604	NAD	C5B-O5B-PA-O1A
4	A	604	NAD	C5B-O5B-PA-O2A
4	A	604	NAD	C5B-O5B-PA-O3
4	A	604	NAD	C5D-O5D-PN-O3
4	A	604	NAD	C5D-O5D-PN-O1N
4	A	604	NAD	O4D-C4D-C5D-O5D
4	A	604	NAD	C2N-C3N-C7N-N7N
4	B	604	NAD	C5B-O5B-PA-O1A
4	B	604	NAD	C5B-O5B-PA-O2A
4	B	604	NAD	C5B-O5B-PA-O3
4	B	604	NAD	C5D-O5D-PN-O3
4	B	604	NAD	C5D-O5D-PN-O1N
4	B	604	NAD	O4D-C4D-C5D-O5D
4	B	604	NAD	C2N-C3N-C7N-N7N
4	C	604	NAD	C5B-O5B-PA-O1A
4	C	604	NAD	C5B-O5B-PA-O2A
4	C	604	NAD	C5B-O5B-PA-O3
4	C	604	NAD	C5D-O5D-PN-O3

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Mol	Chain	Res	Type	Atoms
4	C	604	NAD	C5D-O5D-PN-O1N
4	C	604	NAD	O4D-C4D-C5D-O5D
4	C	604	NAD	C2N-C3N-C7N-N7N
4	D	604	NAD	C5B-O5B-PA-O1A
4	D	604	NAD	C5B-O5B-PA-O2A
4	D	604	NAD	C5B-O5B-PA-O3
4	D	604	NAD	C5D-O5D-PN-O3
4	D	604	NAD	C5D-O5D-PN-O1N
4	D	604	NAD	O4D-C4D-C5D-O5D
4	D	604	NAD	C2N-C3N-C7N-N7N
4	E	604	NAD	C5B-O5B-PA-O1A
4	E	604	NAD	C5B-O5B-PA-O2A
4	E	604	NAD	C5B-O5B-PA-O3
4	E	604	NAD	C5D-O5D-PN-O3
4	E	604	NAD	C5D-O5D-PN-O1N
4	E	604	NAD	O4D-C4D-C5D-O5D
4	E	604	NAD	C2N-C3N-C7N-N7N
4	F	604	NAD	C5B-O5B-PA-O1A
4	F	604	NAD	C5B-O5B-PA-O2A
4	F	604	NAD	C5B-O5B-PA-O3
4	F	604	NAD	C5D-O5D-PN-O3
4	F	604	NAD	C5D-O5D-PN-O1N
4	F	604	NAD	O4D-C4D-C5D-O5D
4	F	604	NAD	C2N-C3N-C7N-N7N
4	G	604	NAD	C5B-O5B-PA-O1A
4	G	604	NAD	C5B-O5B-PA-O2A
4	G	604	NAD	C5B-O5B-PA-O3
4	G	604	NAD	C5D-O5D-PN-O3
4	G	604	NAD	C5D-O5D-PN-O1N
4	G	604	NAD	O4D-C4D-C5D-O5D
4	G	604	NAD	C2N-C3N-C7N-N7N
4	H	604	NAD	C5B-O5B-PA-O1A
4	H	604	NAD	C5B-O5B-PA-O2A
4	H	604	NAD	C5B-O5B-PA-O3
4	H	604	NAD	C5D-O5D-PN-O3
4	H	604	NAD	C5D-O5D-PN-O1N
4	H	604	NAD	O4D-C4D-C5D-O5D
4	H	604	NAD	C2N-C3N-C7N-N7N
4	A	604	NAD	C4N-C3N-C7N-N7N
4	B	604	NAD	C4N-C3N-C7N-N7N
4	C	604	NAD	C4N-C3N-C7N-N7N
4	D	604	NAD	C4N-C3N-C7N-N7N

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Mol	Chain	Res	Type	Atoms
4	E	604	NAD	C4N-C3N-C7N-N7N
4	F	604	NAD	C4N-C3N-C7N-N7N
4	G	604	NAD	C4N-C3N-C7N-N7N
4	H	604	NAD	C4N-C3N-C7N-N7N
4	A	604	NAD	C2N-C3N-C7N-O7N
4	B	604	NAD	C2N-C3N-C7N-O7N
4	C	604	NAD	C2N-C3N-C7N-O7N
4	D	604	NAD	C2N-C3N-C7N-O7N
4	E	604	NAD	C2N-C3N-C7N-O7N
4	F	604	NAD	C2N-C3N-C7N-O7N
4	G	604	NAD	C2N-C3N-C7N-O7N
4	H	604	NAD	C2N-C3N-C7N-O7N
4	A	604	NAD	C4N-C3N-C7N-O7N
4	B	604	NAD	C4N-C3N-C7N-O7N
4	C	604	NAD	C4N-C3N-C7N-O7N
4	D	604	NAD	C4N-C3N-C7N-O7N
4	E	604	NAD	C4N-C3N-C7N-O7N
4	F	604	NAD	C4N-C3N-C7N-O7N
4	G	604	NAD	C4N-C3N-C7N-O7N
4	H	604	NAD	C4N-C3N-C7N-O7N
3	A	603	IMP	C3'-C4'-C5'-O5'
3	B	603	IMP	C3'-C4'-C5'-O5'
3	C	603	IMP	C3'-C4'-C5'-O5'
3	D	603	IMP	C3'-C4'-C5'-O5'
3	E	603	IMP	C3'-C4'-C5'-O5'
3	F	603	IMP	C3'-C4'-C5'-O5'
3	G	603	IMP	C3'-C4'-C5'-O5'
3	H	603	IMP	C3'-C4'-C5'-O5'
4	A	604	NAD	C3D-C4D-C5D-O5D
4	B	604	NAD	C3D-C4D-C5D-O5D
4	C	604	NAD	C3D-C4D-C5D-O5D
4	D	604	NAD	C3D-C4D-C5D-O5D
4	E	604	NAD	C3D-C4D-C5D-O5D
4	F	604	NAD	C3D-C4D-C5D-O5D
4	G	604	NAD	C3D-C4D-C5D-O5D
4	H	604	NAD	C3D-C4D-C5D-O5D
3	A	603	IMP	O4'-C4'-C5'-O5'
3	B	603	IMP	O4'-C4'-C5'-O5'
3	C	603	IMP	O4'-C4'-C5'-O5'
3	D	603	IMP	O4'-C4'-C5'-O5'
3	E	603	IMP	O4'-C4'-C5'-O5'
3	F	603	IMP	O4'-C4'-C5'-O5'

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Mol	Chain	Res	Type	Atoms
3	G	603	IMP	O4'-C4'-C5'-O5'
3	H	603	IMP	O4'-C4'-C5'-O5'
4	A	604	NAD	O4B-C4B-C5B-O5B
4	B	604	NAD	O4B-C4B-C5B-O5B
4	C	604	NAD	O4B-C4B-C5B-O5B
4	D	604	NAD	O4B-C4B-C5B-O5B
4	E	604	NAD	O4B-C4B-C5B-O5B
4	F	604	NAD	O4B-C4B-C5B-O5B
4	G	604	NAD	O4B-C4B-C5B-O5B
4	H	604	NAD	O4B-C4B-C5B-O5B
4	A	604	NAD	PN-O3-PA-O1A
4	B	604	NAD	PN-O3-PA-O1A
4	C	604	NAD	PN-O3-PA-O1A
4	D	604	NAD	PN-O3-PA-O1A
4	E	604	NAD	PN-O3-PA-O1A
4	F	604	NAD	PN-O3-PA-O1A
4	G	604	NAD	PN-O3-PA-O1A
4	H	604	NAD	PN-O3-PA-O1A
2	A	601	ATP	PB-O3A-PA-O5'
2	A	602	ATP	PB-O3A-PA-O5'
2	B	601	ATP	PB-O3A-PA-O5'
2	B	602	ATP	PB-O3A-PA-O5'
2	C	601	ATP	PB-O3A-PA-O5'
2	D	601	ATP	PB-O3A-PA-O5'
2	D	602	ATP	PB-O3A-PA-O5'
2	G	602	ATP	PB-O3A-PA-O5'
2	H	602	ATP	PB-O3A-PA-O5'
4	A	604	NAD	C3B-C4B-C5B-O5B
4	B	604	NAD	C3B-C4B-C5B-O5B
4	C	604	NAD	C3B-C4B-C5B-O5B
4	D	604	NAD	C3B-C4B-C5B-O5B
4	E	604	NAD	C3B-C4B-C5B-O5B
4	F	604	NAD	C3B-C4B-C5B-O5B
4	G	604	NAD	C3B-C4B-C5B-O5B
4	H	604	NAD	C3B-C4B-C5B-O5B
2	A	601	ATP	PG-O3B-PB-O1B
2	B	601	ATP	PG-O3B-PB-O1B
2	C	601	ATP	PG-O3B-PB-O1B
2	D	601	ATP	PG-O3B-PB-O1B
2	A	601	ATP	PG-O3B-PB-O2B
2	B	601	ATP	PG-O3B-PB-O2B
2	C	601	ATP	PG-O3B-PB-O2B

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Mol	Chain	Res	Type	Atoms
2	D	601	ATP	PG-O3B-PB-O2B
2	F	602	ATP	PG-O3B-PB-O1B
2	C	602	ATP	PB-O3A-PA-O5'
2	E	602	ATP	PB-O3A-PA-O5'
2	F	602	ATP	PB-O3A-PA-O5'
4	A	604	NAD	PN-O3-PA-O5B
4	B	604	NAD	PN-O3-PA-O5B
4	C	604	NAD	PN-O3-PA-O5B
4	D	604	NAD	PN-O3-PA-O5B
4	E	604	NAD	PN-O3-PA-O5B
4	F	604	NAD	PN-O3-PA-O5B
4	G	604	NAD	PN-O3-PA-O5B
4	H	604	NAD	PN-O3-PA-O5B
4	A	604	NAD	C4B-C5B-O5B-PA
4	B	604	NAD	C4B-C5B-O5B-PA
4	C	604	NAD	C4B-C5B-O5B-PA
4	D	604	NAD	C4B-C5B-O5B-PA
4	E	604	NAD	C4B-C5B-O5B-PA
4	F	604	NAD	C4B-C5B-O5B-PA
4	G	604	NAD	C4B-C5B-O5B-PA
4	H	604	NAD	C4B-C5B-O5B-PA
2	A	602	ATP	PB-O3A-PA-O2A
2	B	602	ATP	PG-O3B-PB-O2B
2	C	602	ATP	PB-O3A-PA-O2A
2	D	602	ATP	PG-O3B-PB-O1B
2	D	602	ATP	PG-O3B-PB-O2B
2	F	602	ATP	PG-O3B-PB-O2B
2	F	602	ATP	PB-O3A-PA-O2A
2	G	602	ATP	PG-O3B-PB-O2B
2	H	602	ATP	PG-O3B-PB-O1B
2	A	602	ATP	PG-O3B-PB-O1B
2	A	602	ATP	PG-O3B-PB-O2B
2	B	602	ATP	PG-O3B-PB-O1B
2	B	602	ATP	PB-O3A-PA-O2A
2	C	602	ATP	PG-O3B-PB-O1B
2	C	602	ATP	PG-O3B-PB-O2B
2	D	602	ATP	PB-O3A-PA-O2A
2	E	602	ATP	PG-O3B-PB-O1B
2	E	602	ATP	PG-O3B-PB-O2B
2	E	602	ATP	PB-O3A-PA-O2A
2	G	602	ATP	PG-O3B-PB-O1B
2	G	602	ATP	PB-O3A-PA-O2A

Continued on next page...

Continued from previous page...

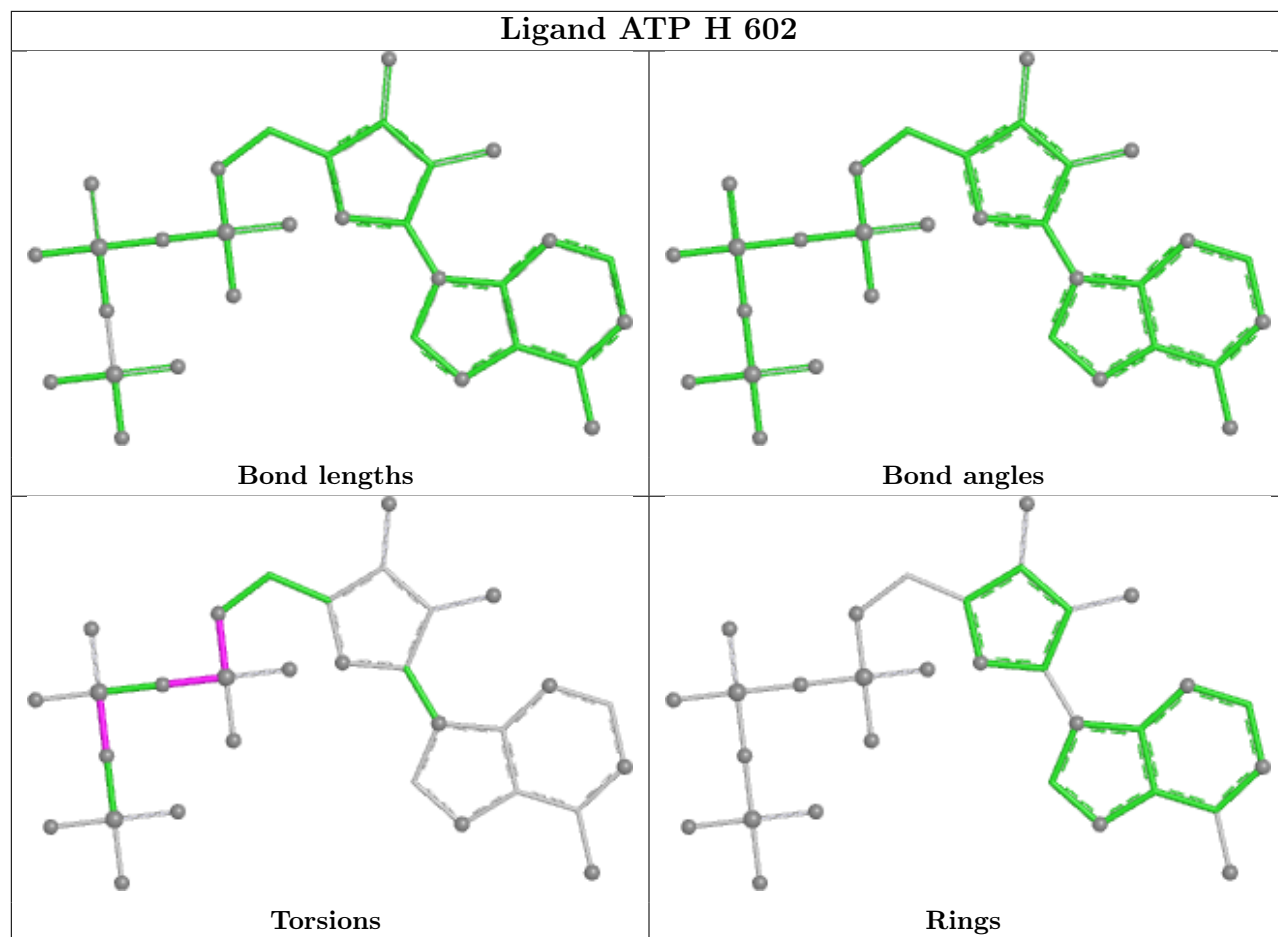
Mol	Chain	Res	Type	Atoms
2	H	602	ATP	PG-O3B-PB-O2B
2	H	602	ATP	PB-O3A-PA-O2A

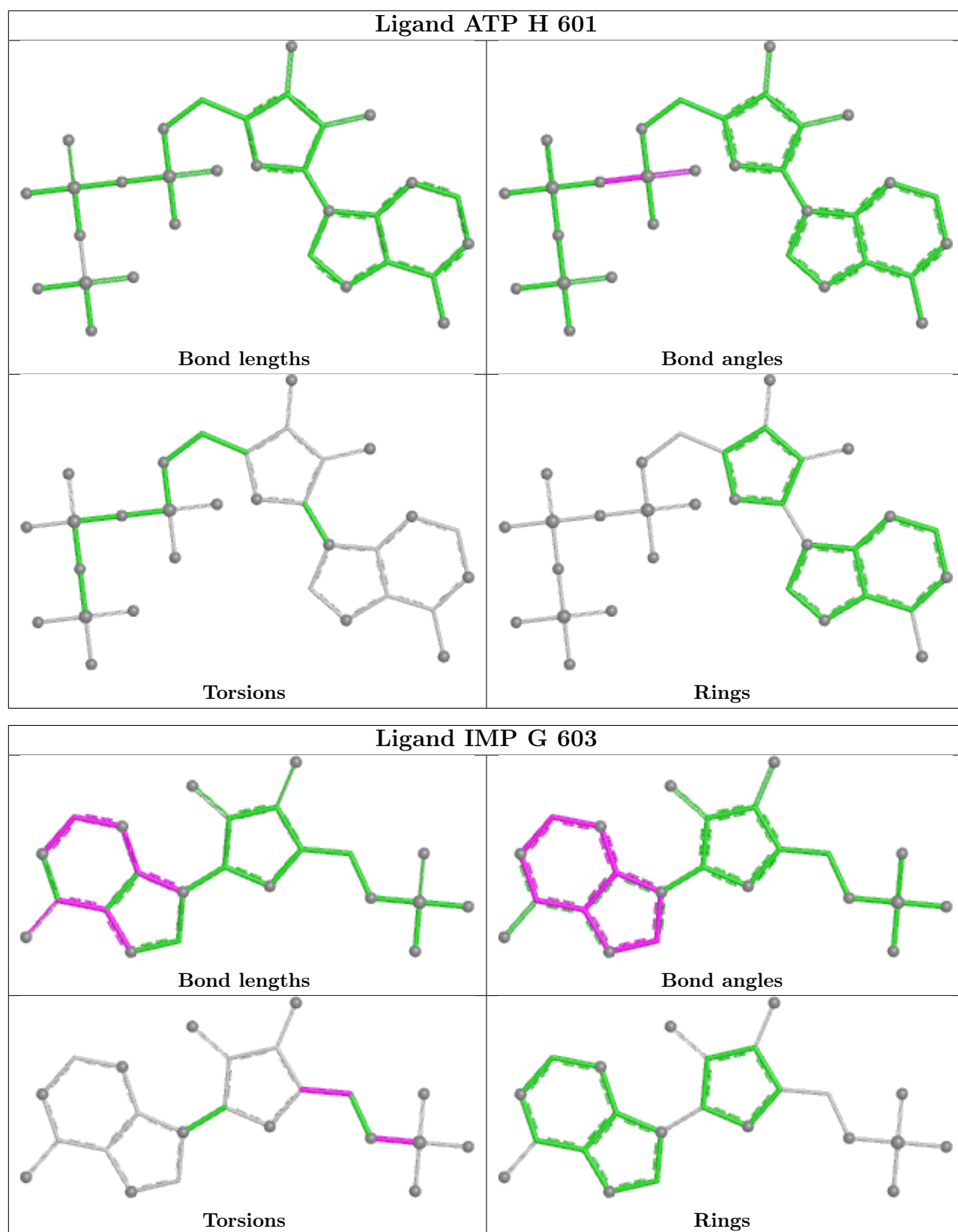
There are no ring outliers.

8 monomers are involved in 8 short contacts:

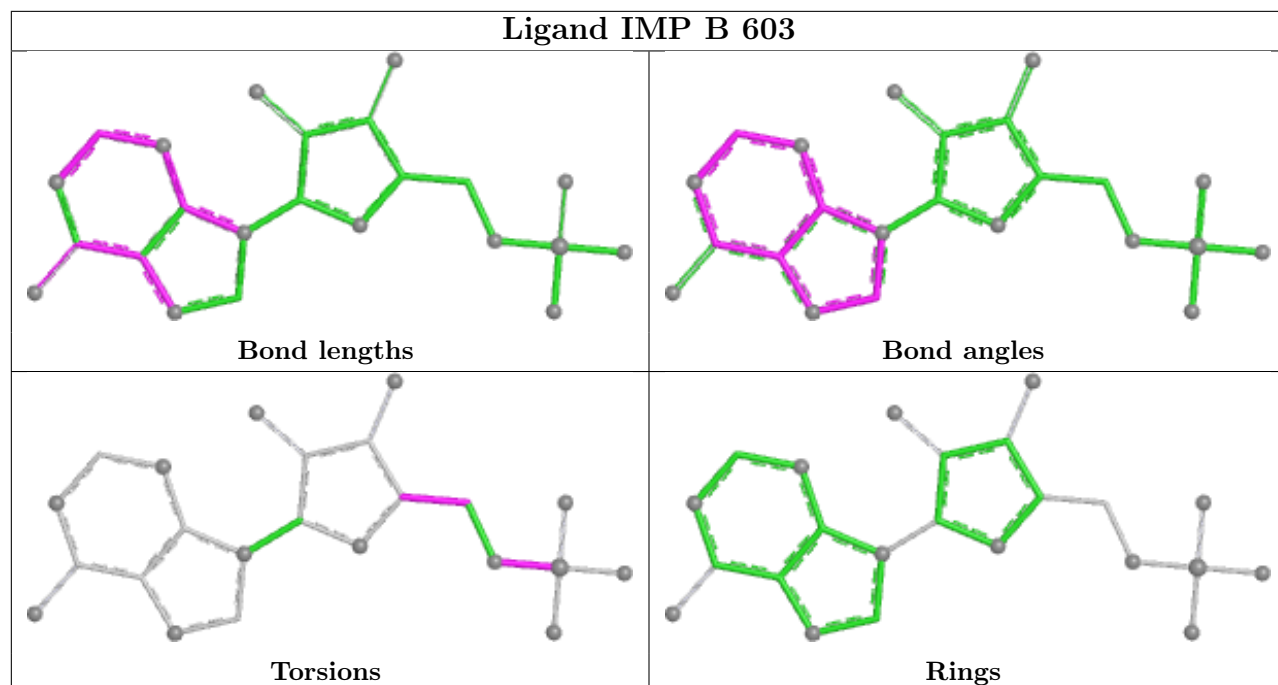
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	G	603	IMP	1	0
3	B	603	IMP	1	0
3	D	603	IMP	1	0
3	F	603	IMP	1	0
3	E	603	IMP	1	0
3	A	603	IMP	1	0
3	C	603	IMP	1	0
3	H	603	IMP	1	0

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

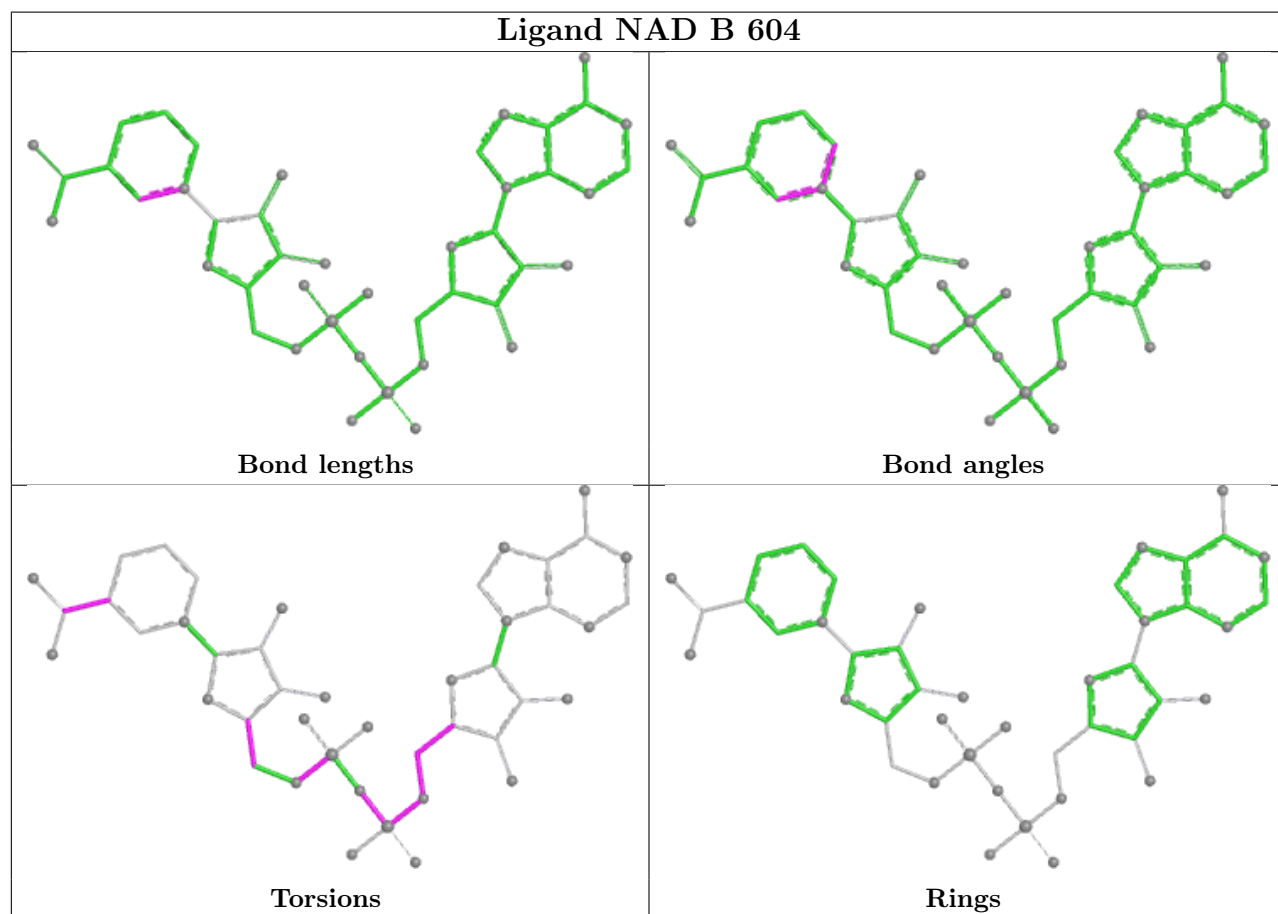




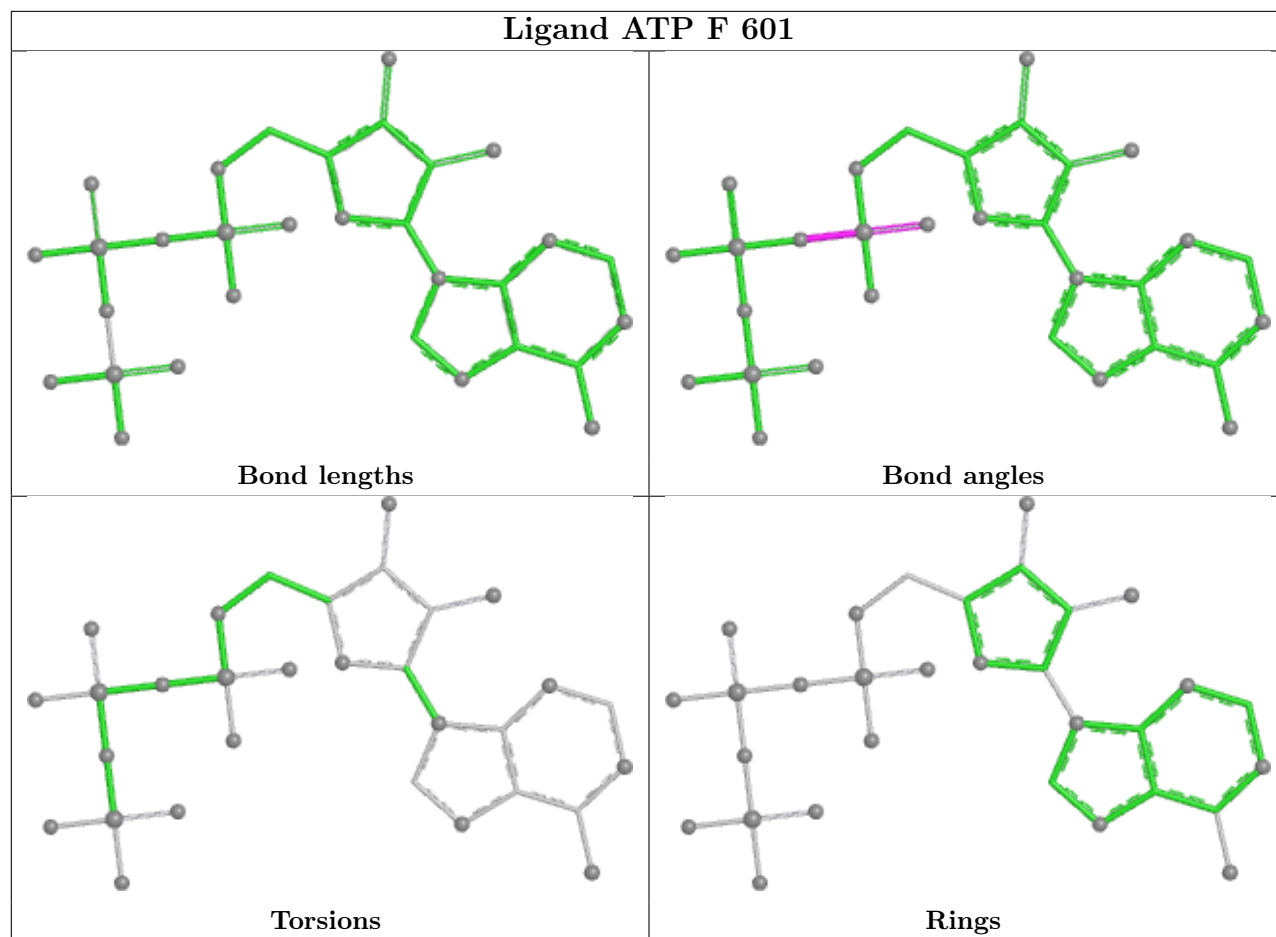
Ligand IMP B 603



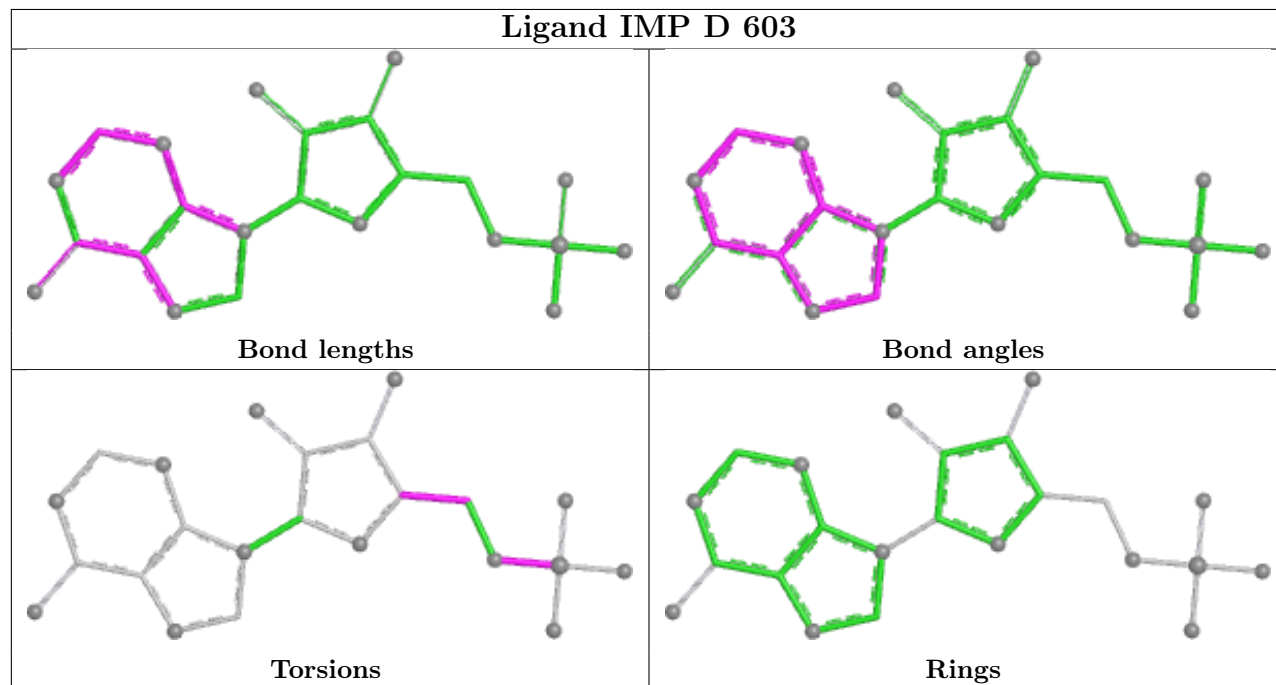
Ligand NAD B 604

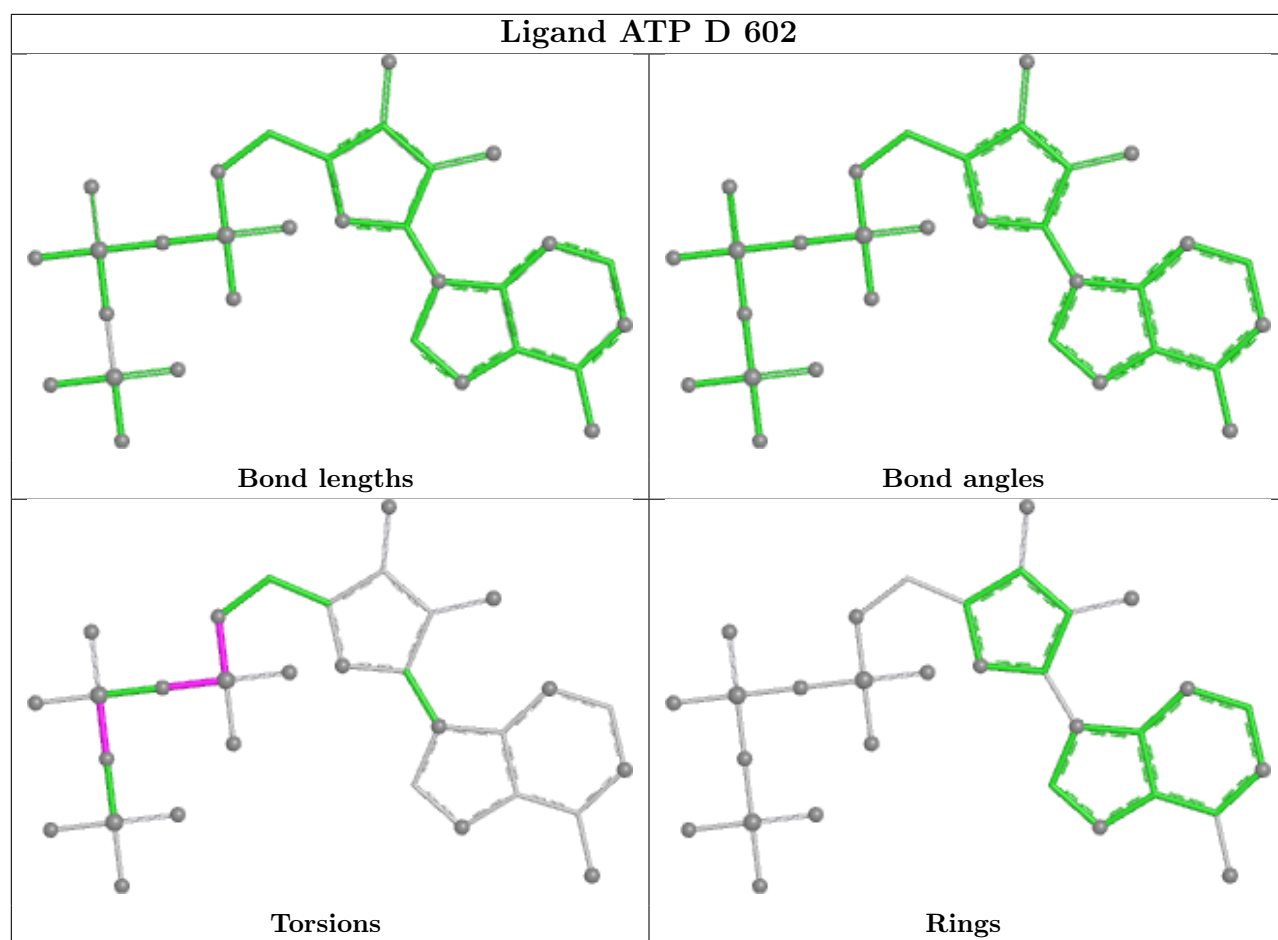


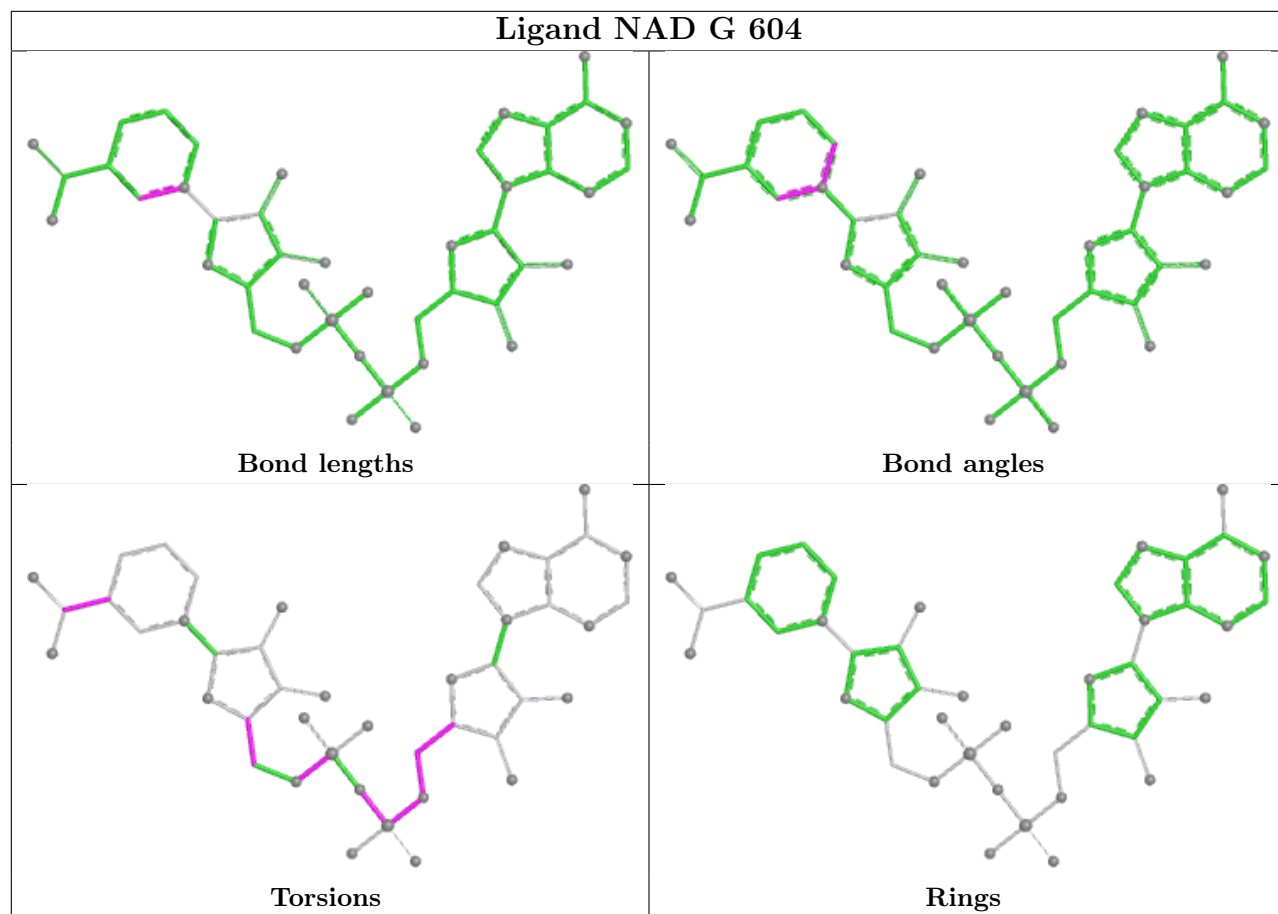
Ligand ATP F 601

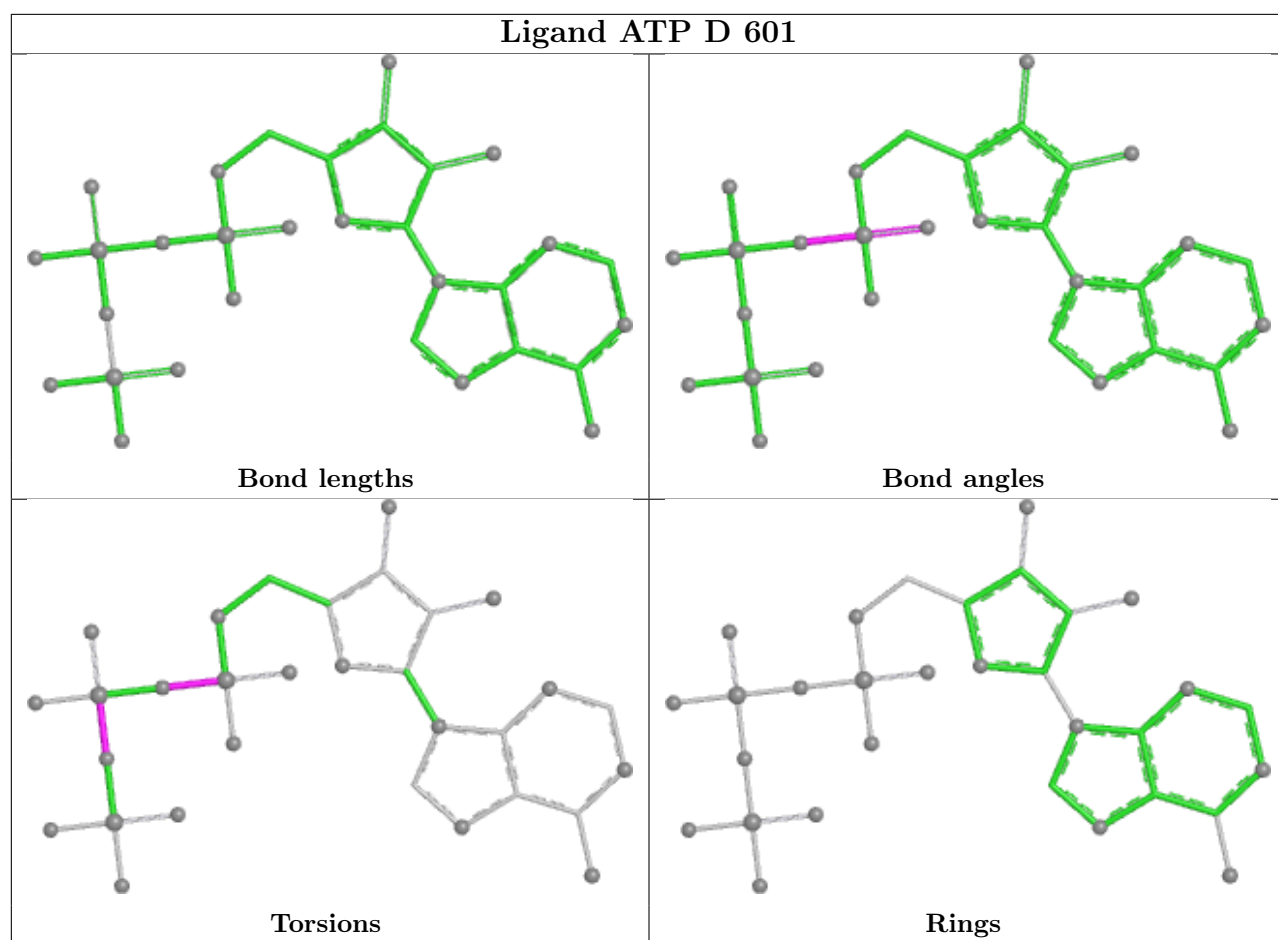


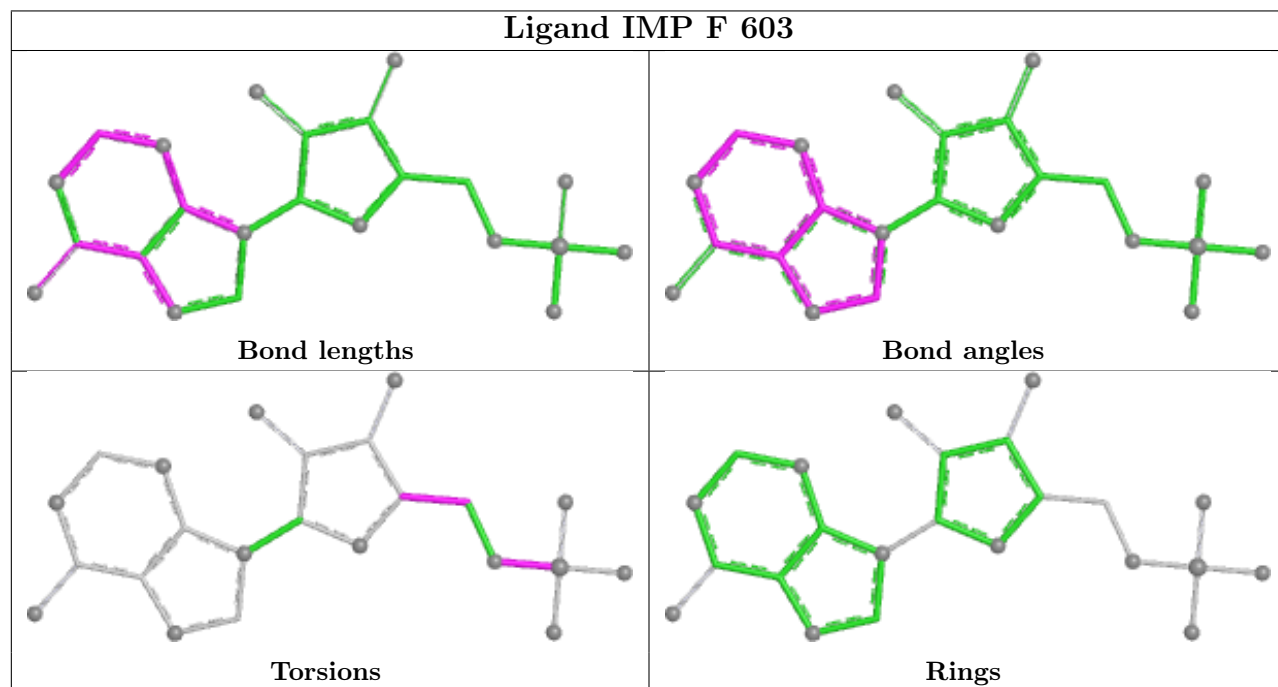
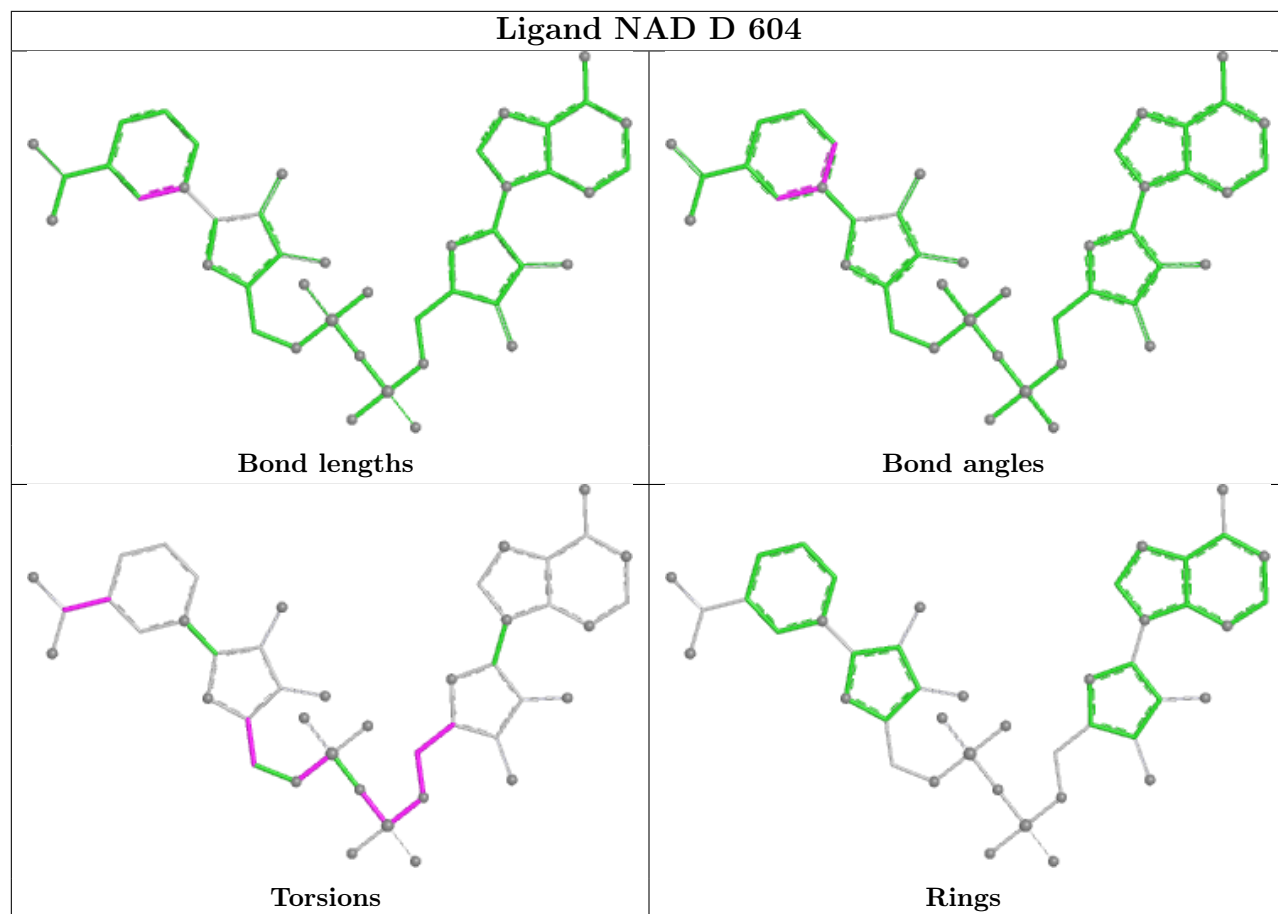
Ligand IMP D 603

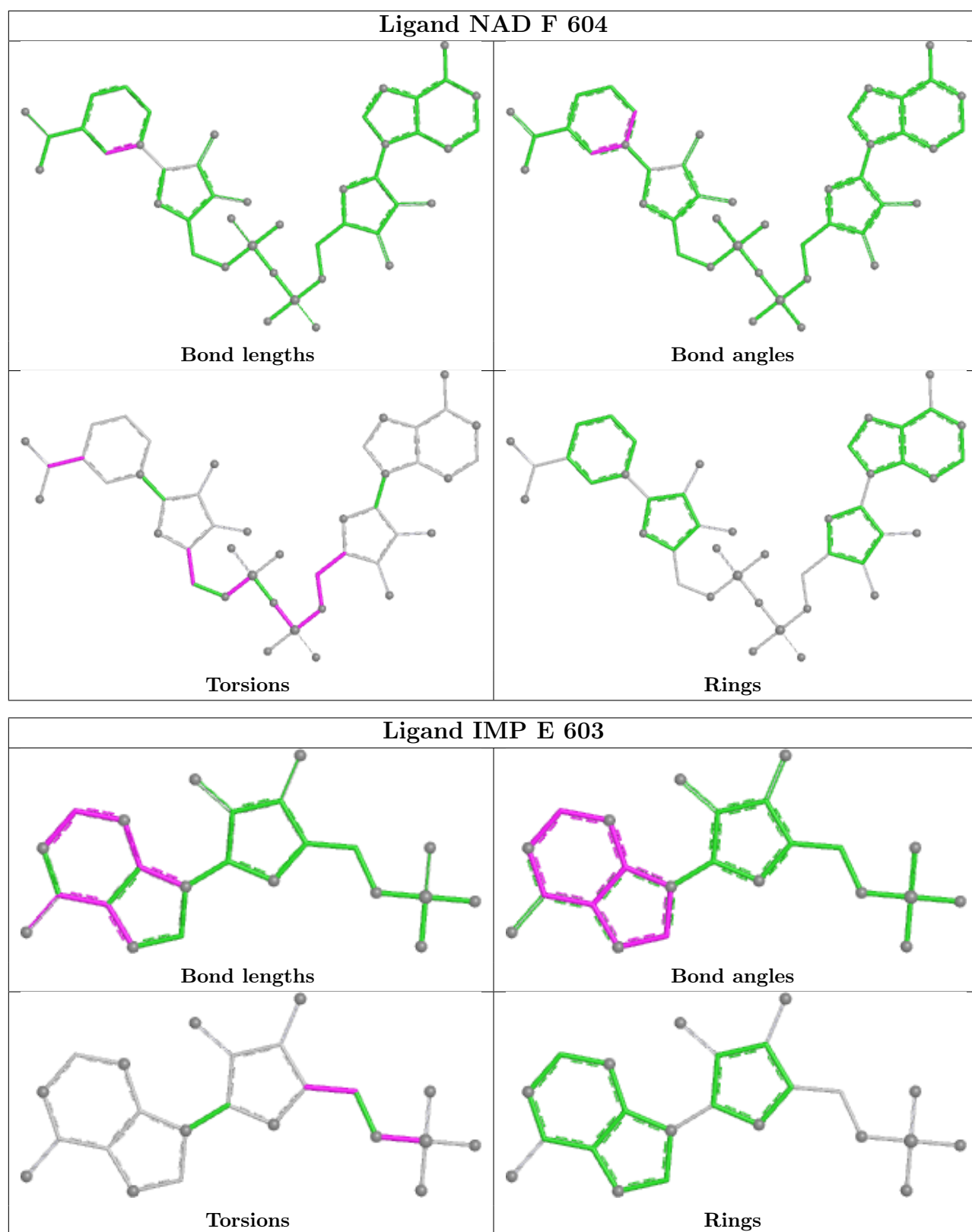




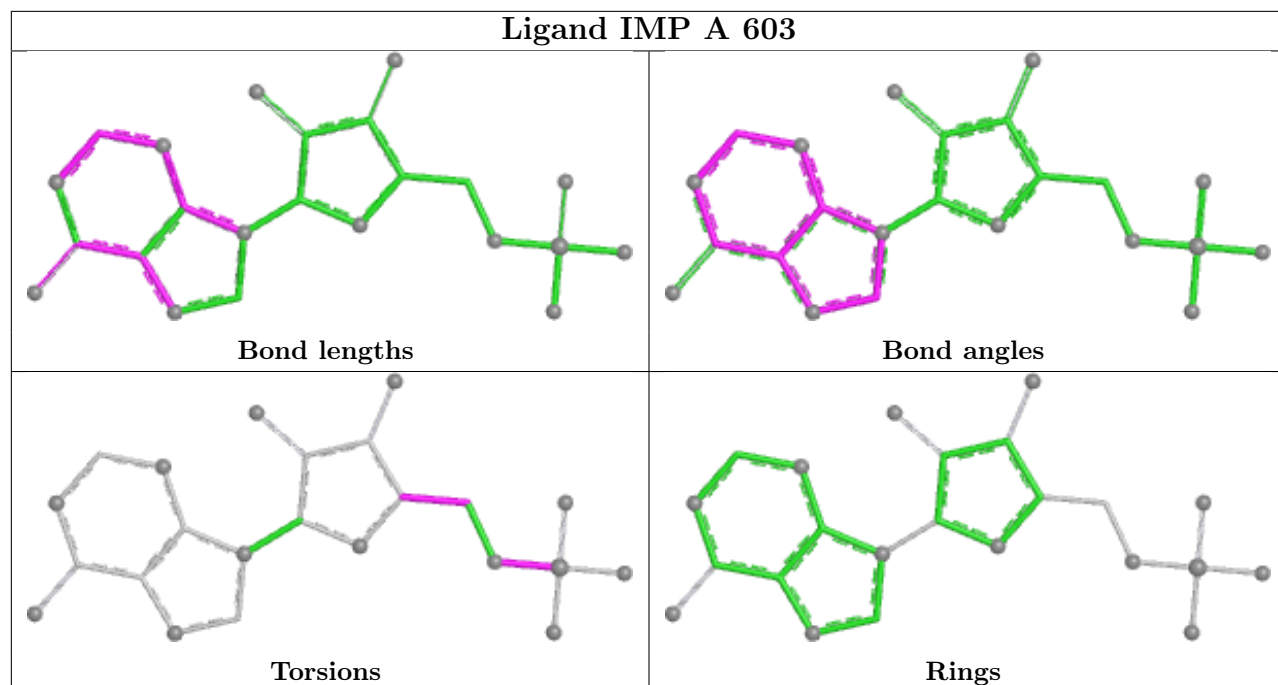




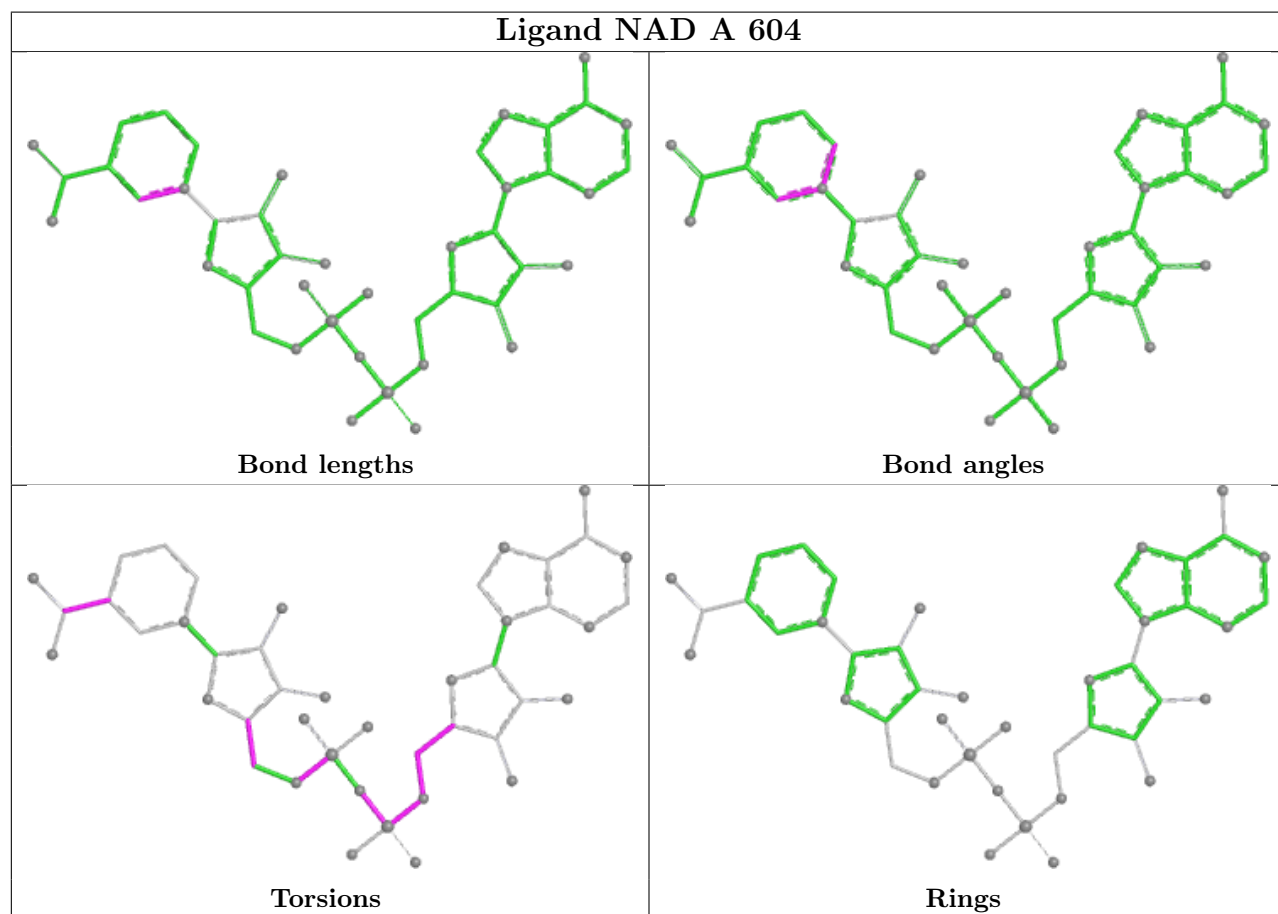


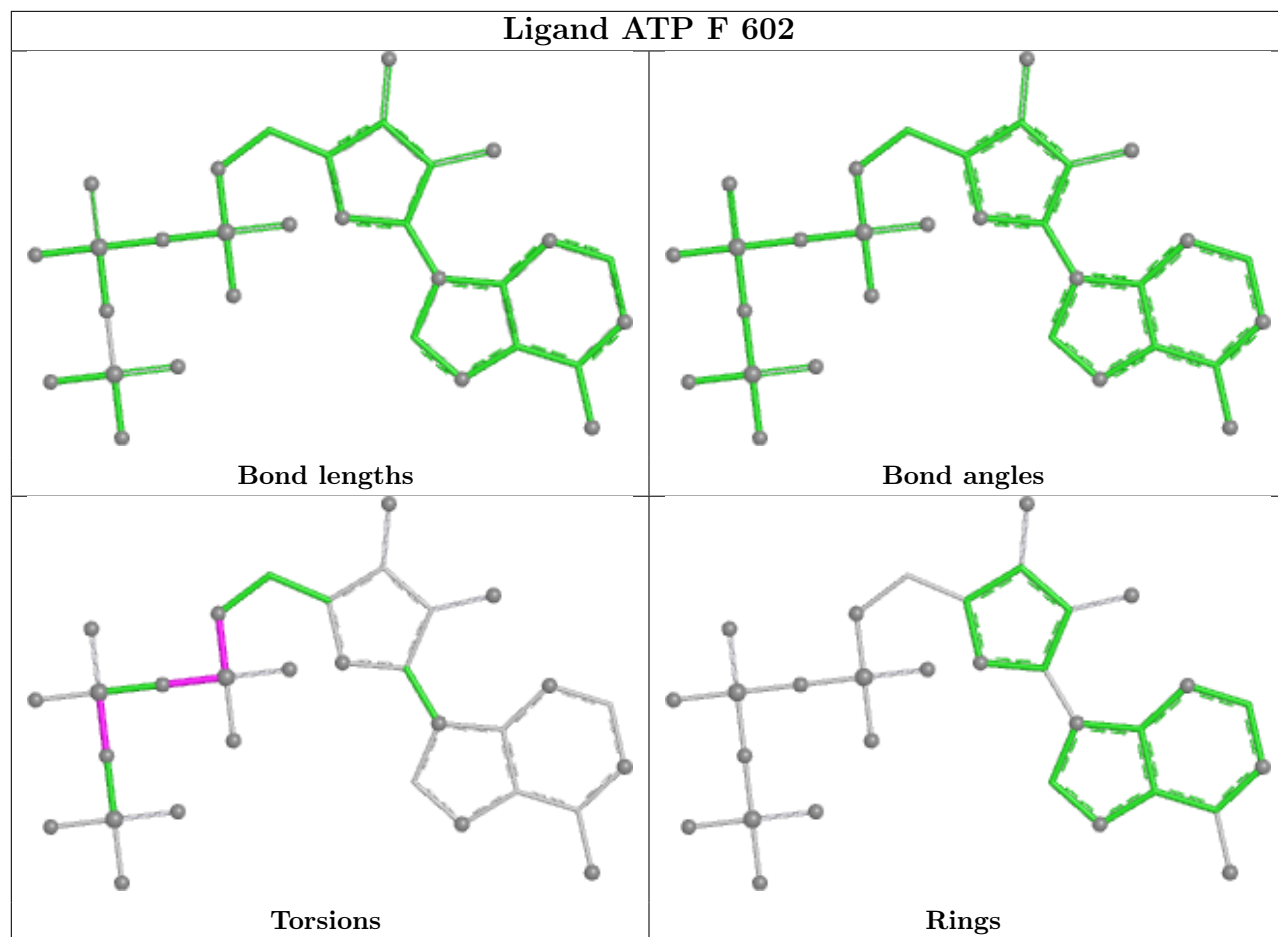


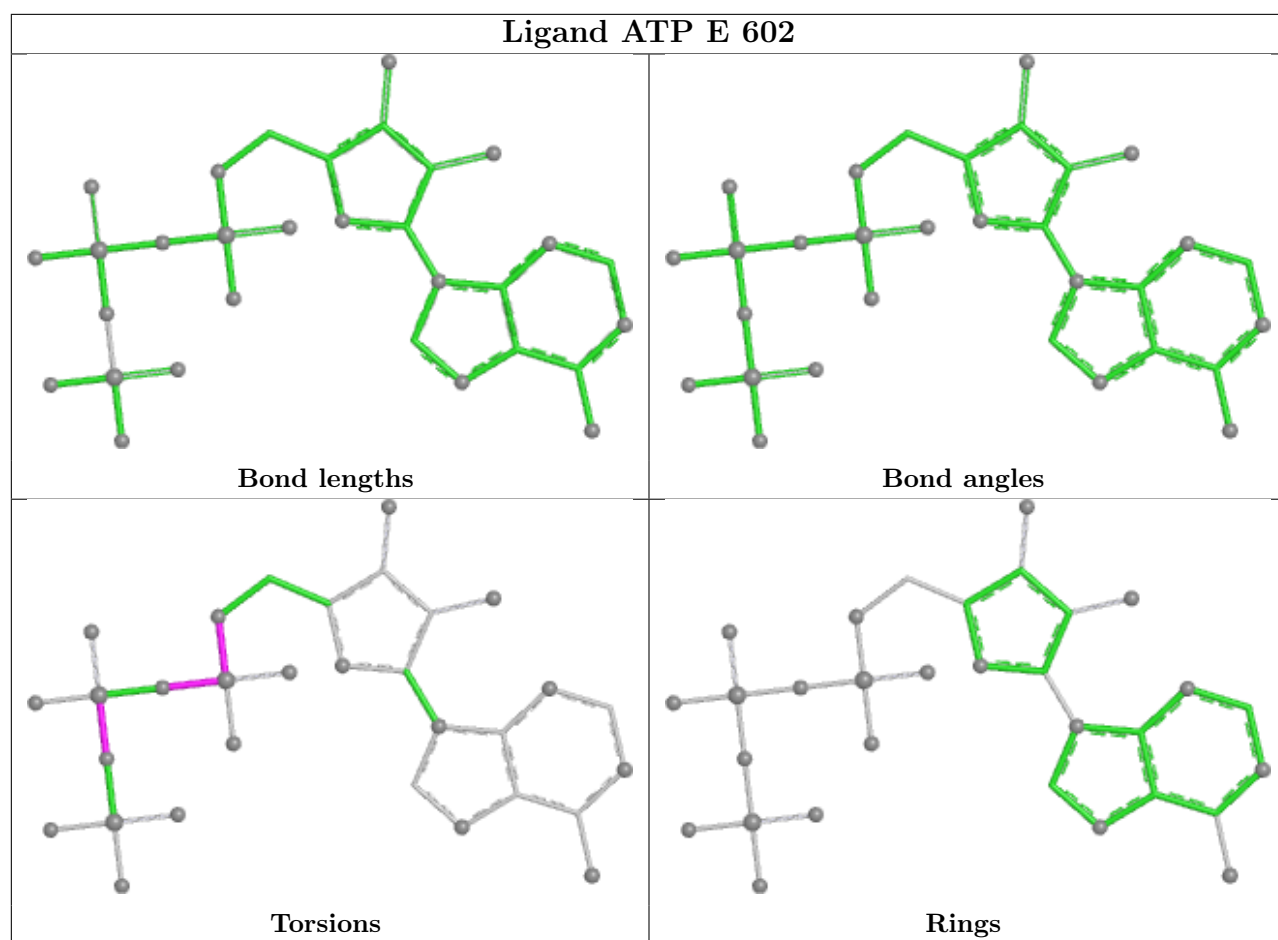
Ligand IMP A 603

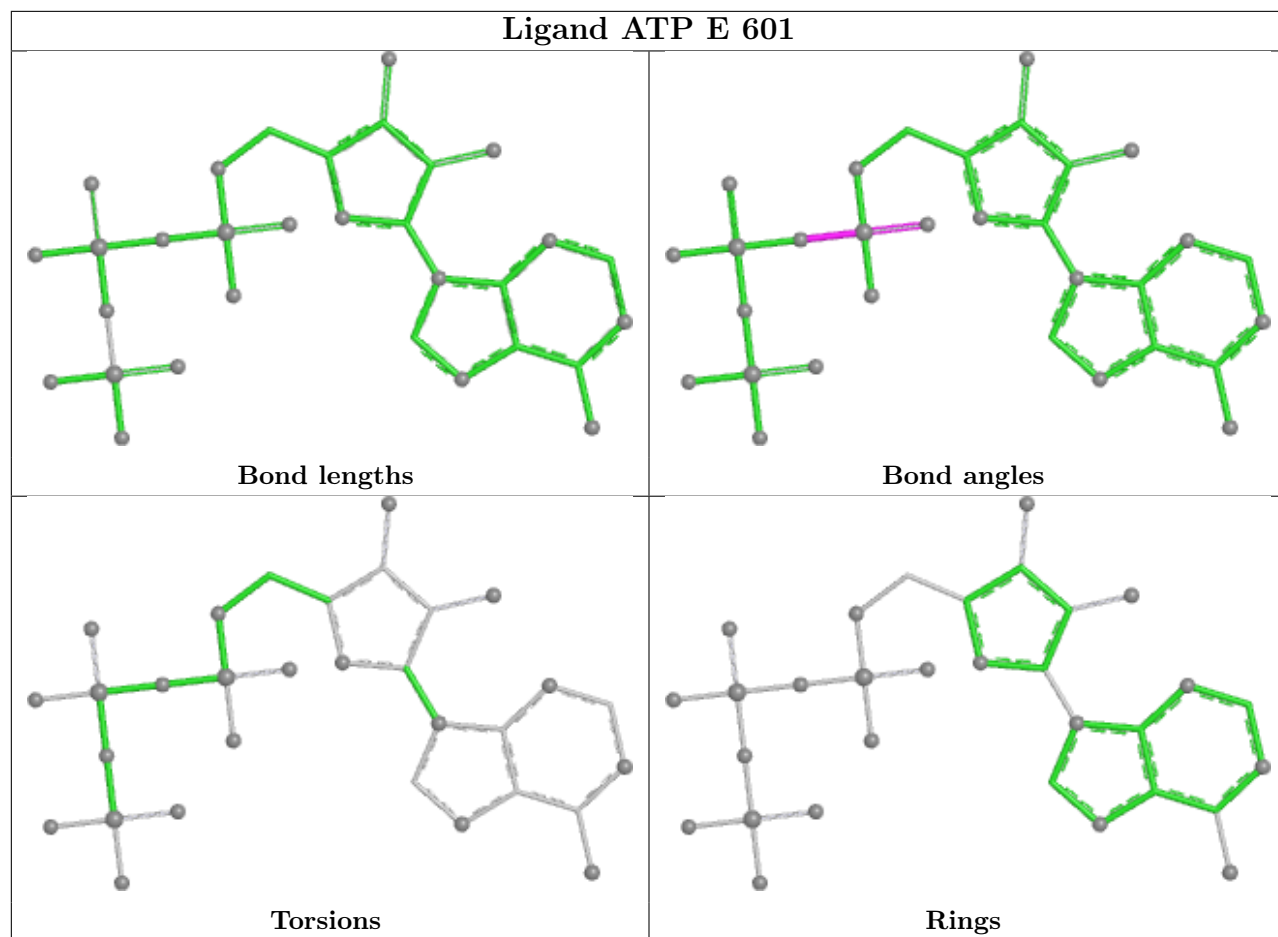


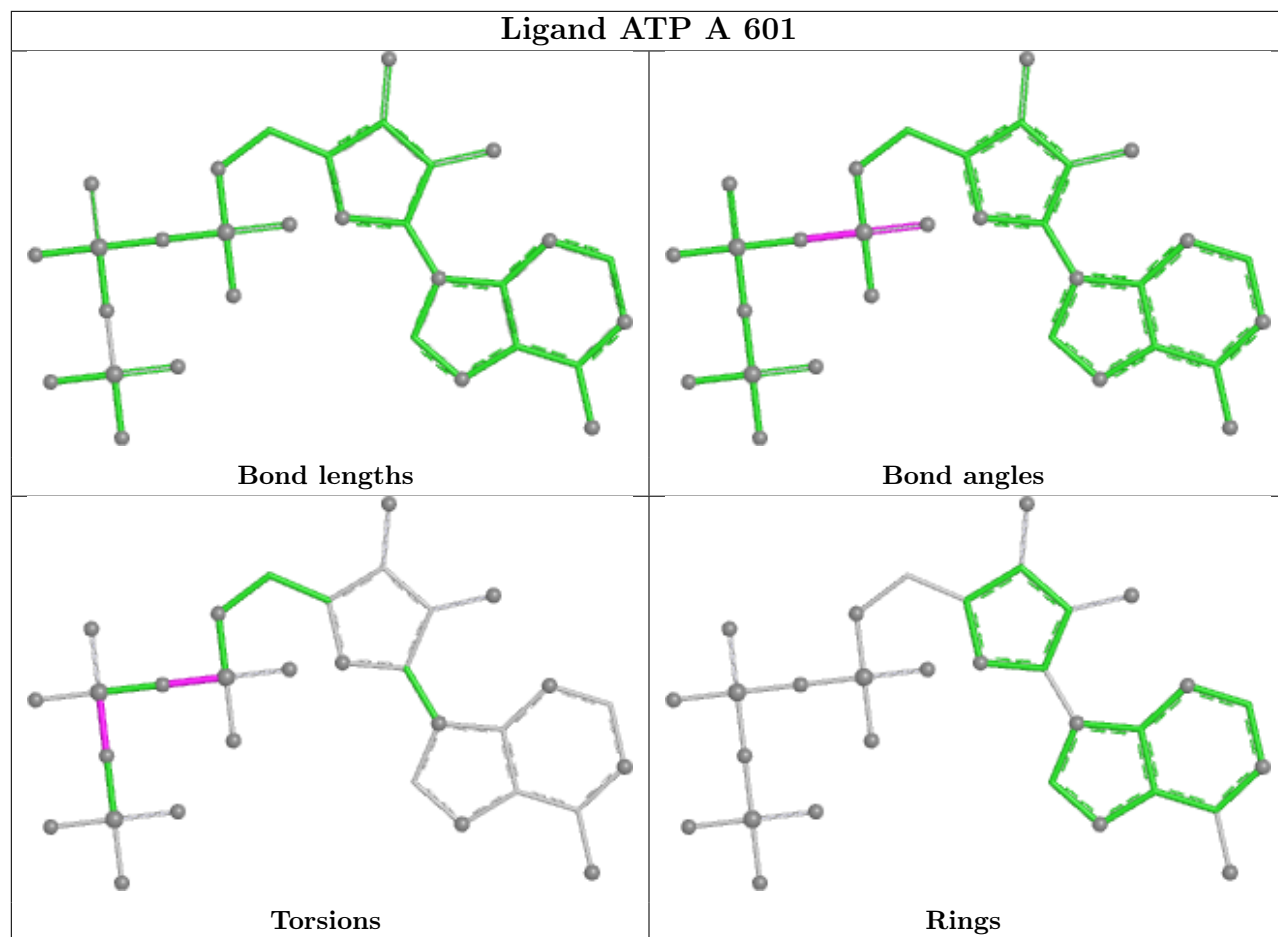
Ligand NAD A 604

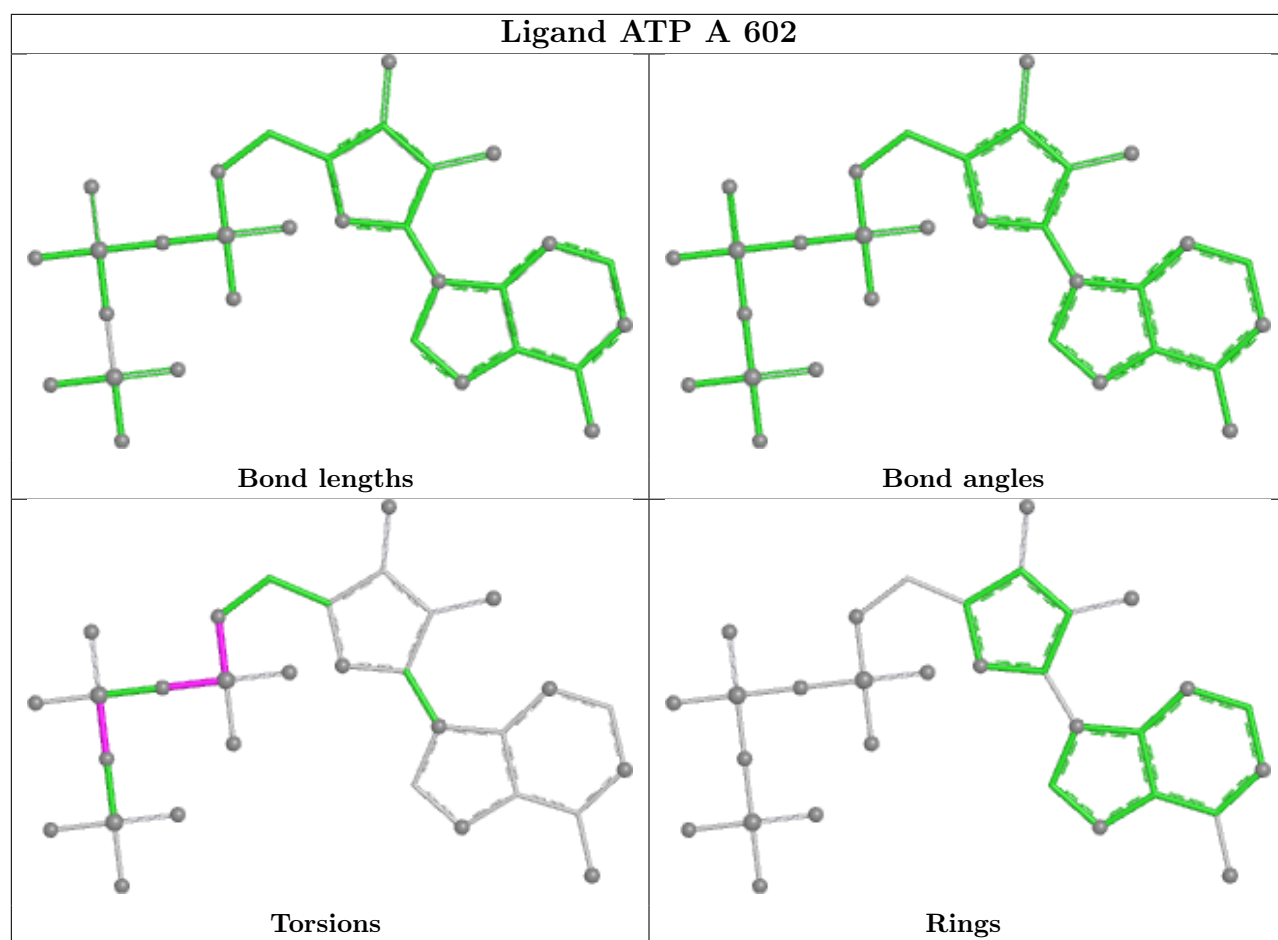


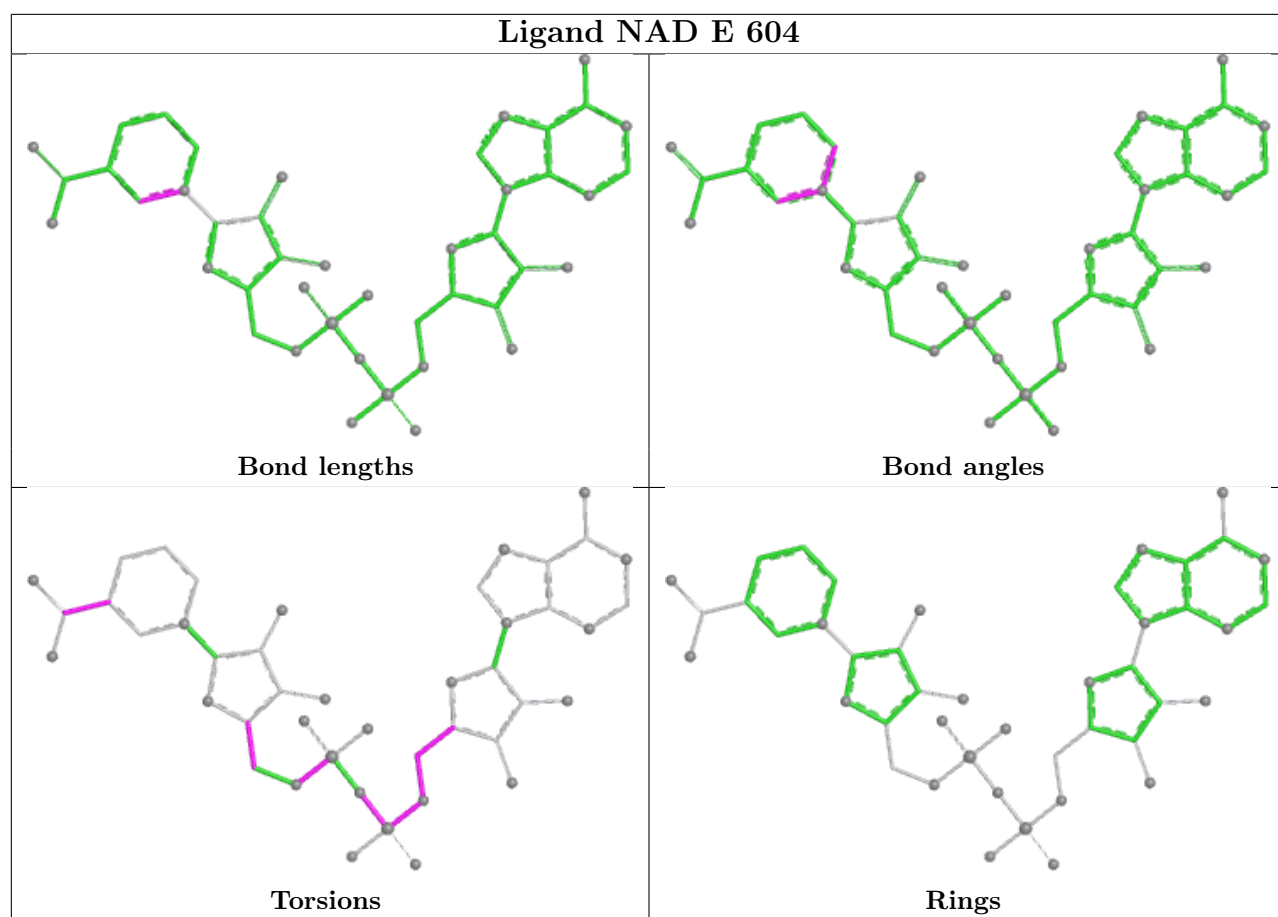


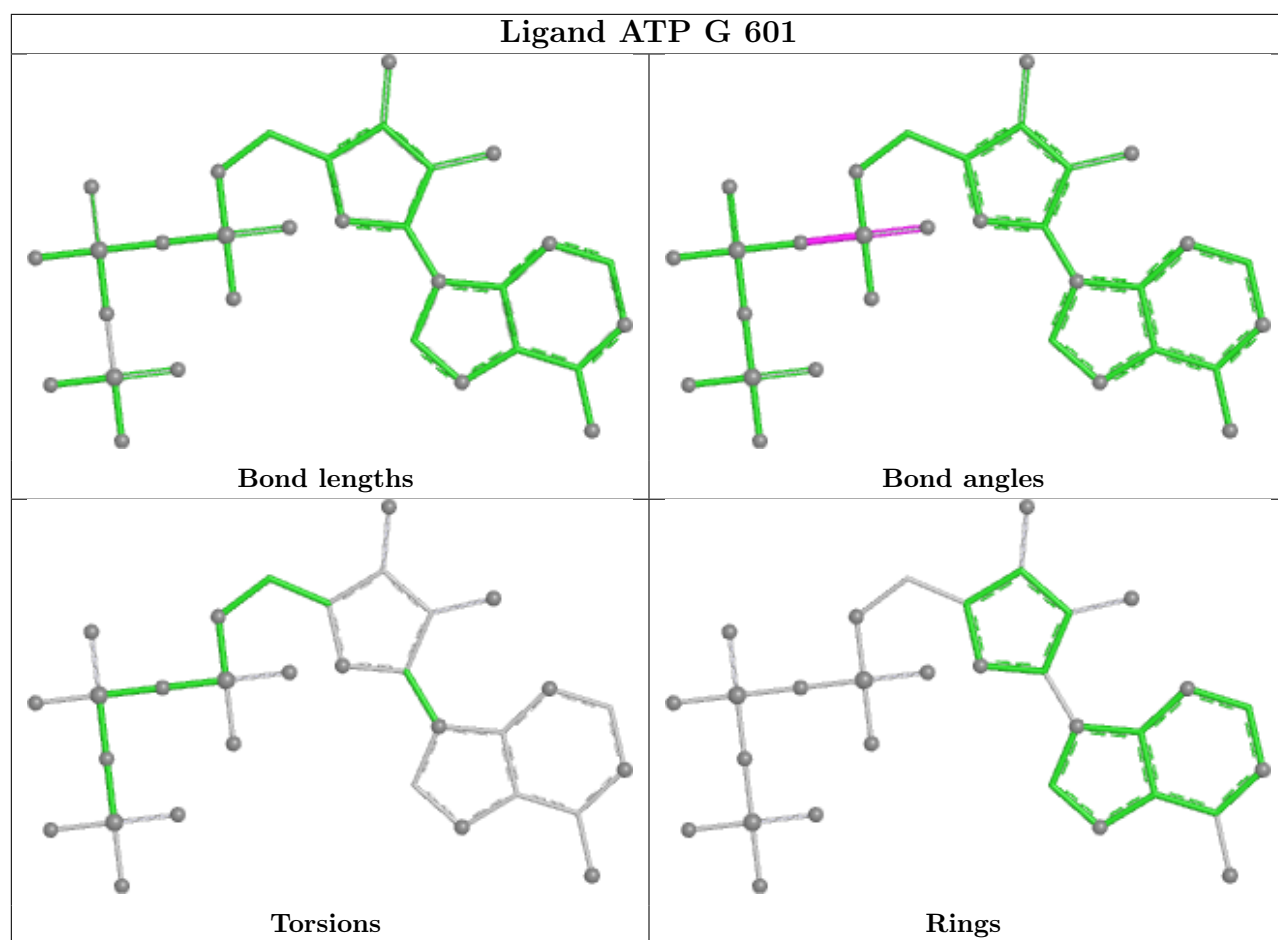




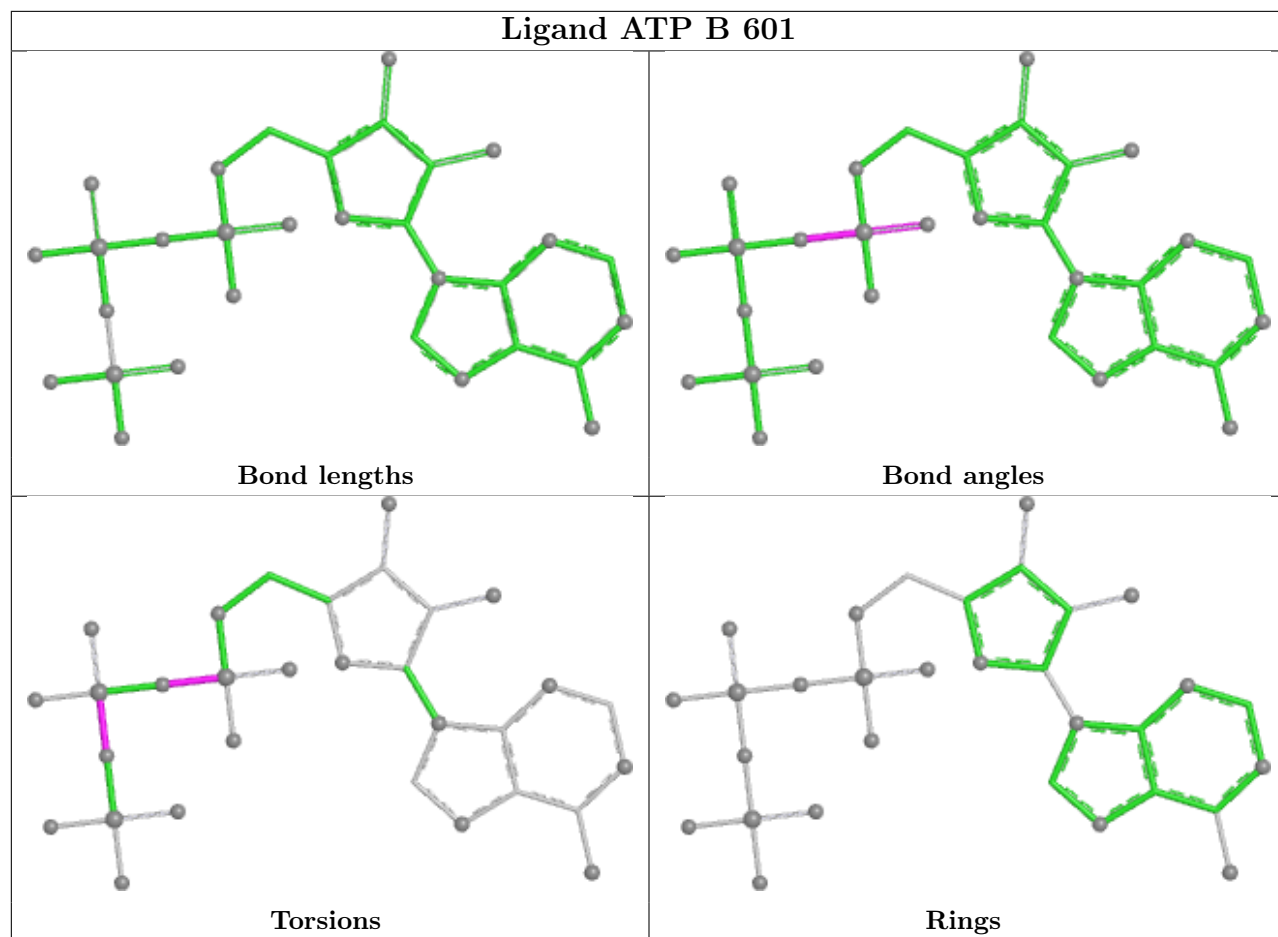




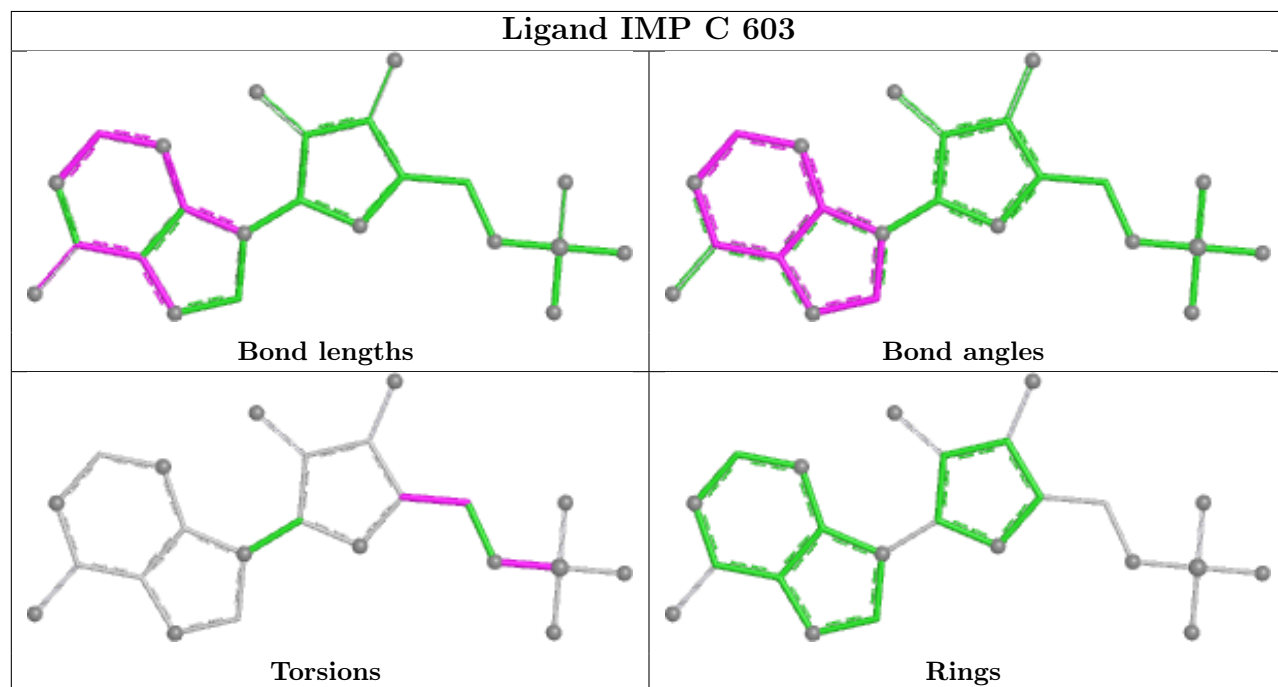


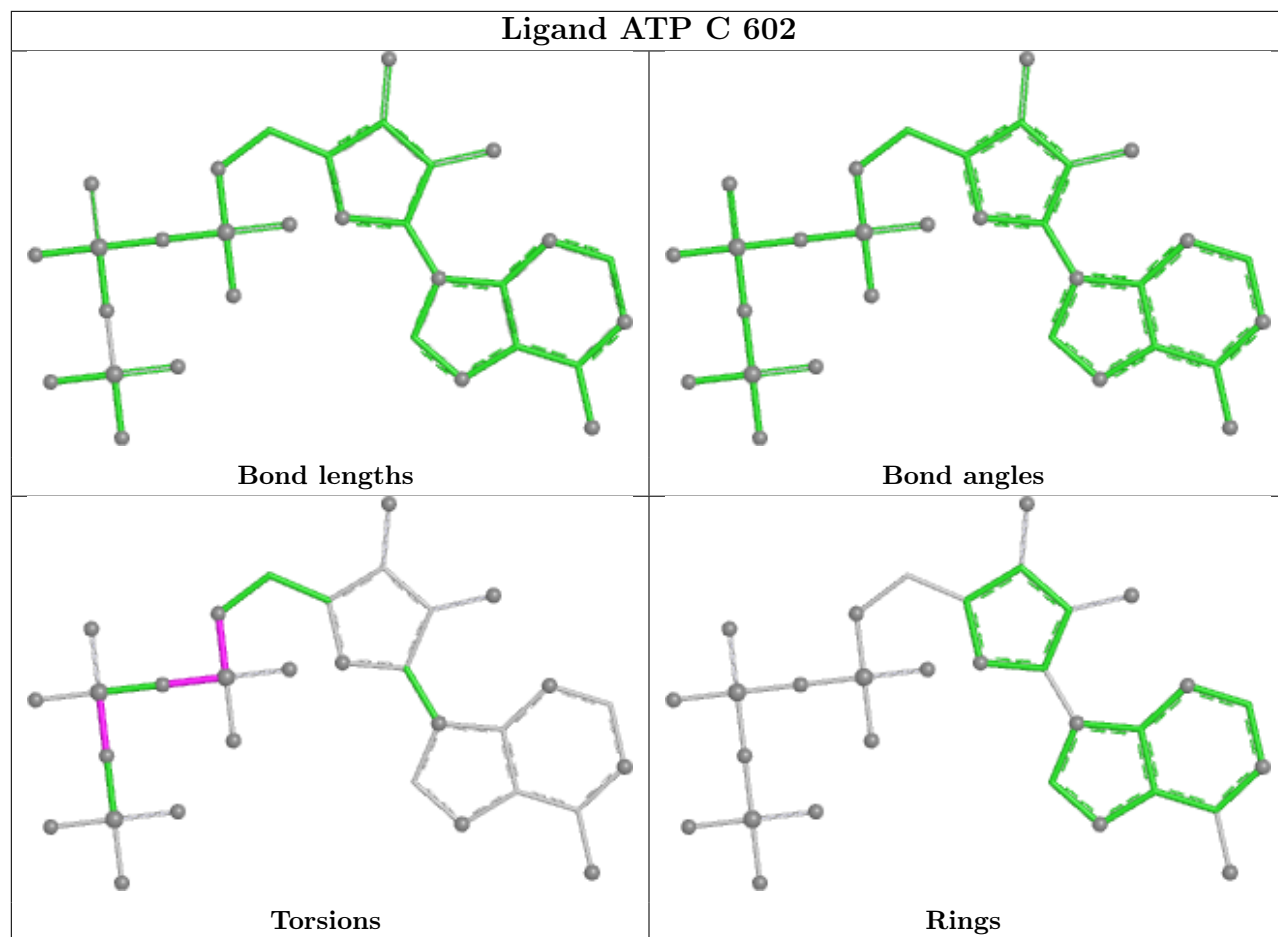


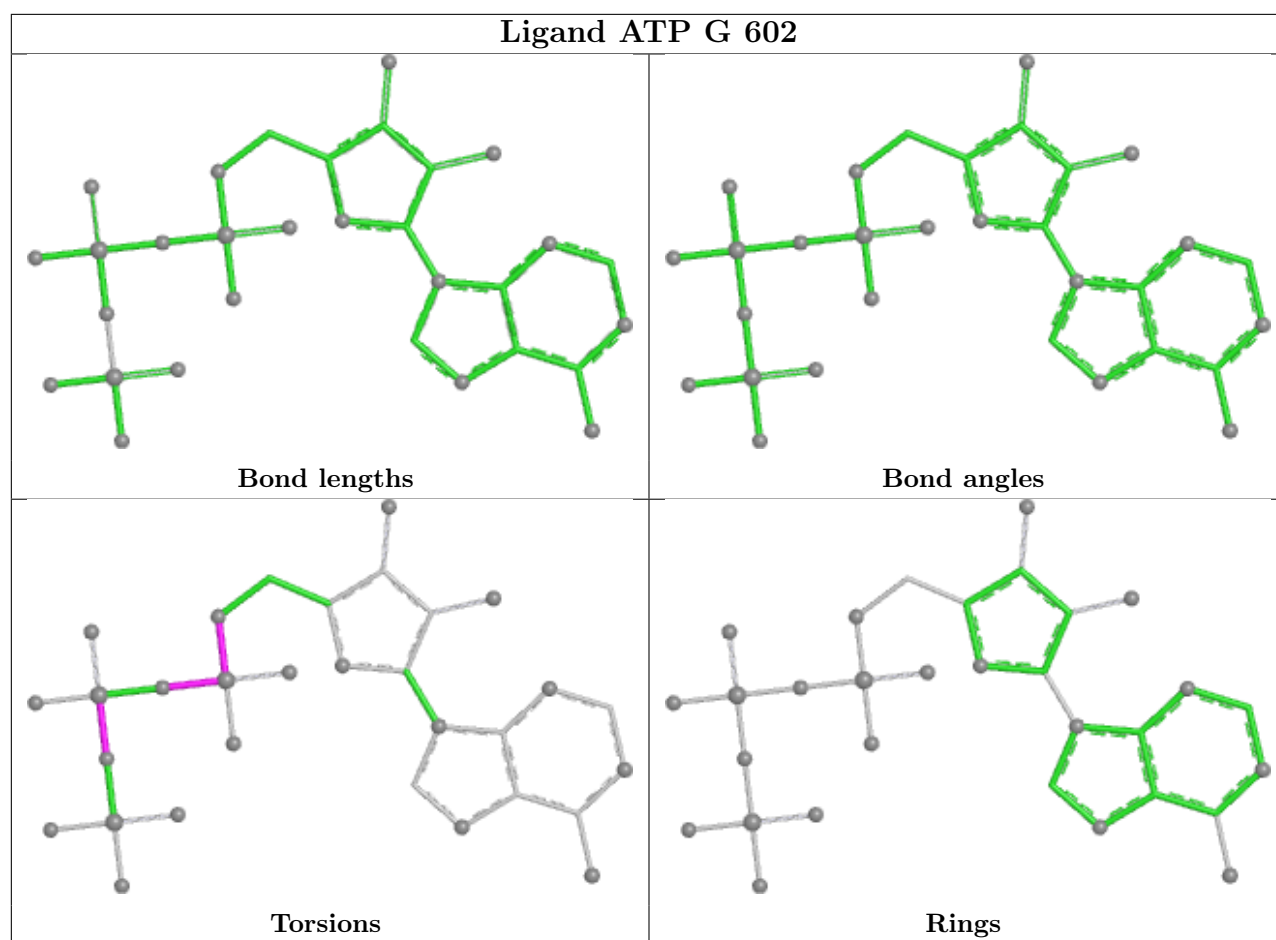
Ligand ATP B 601

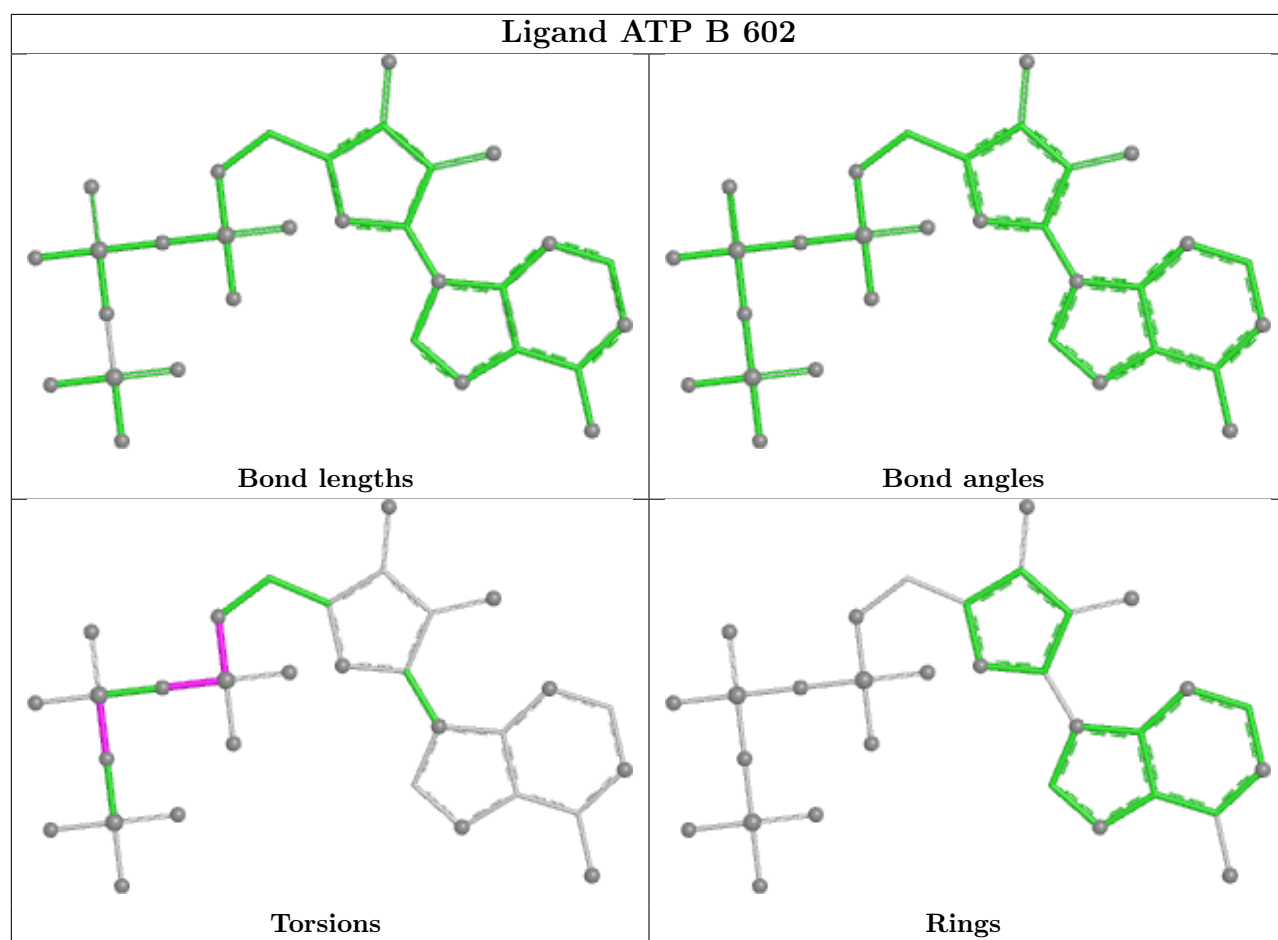


Ligand IMP C 603

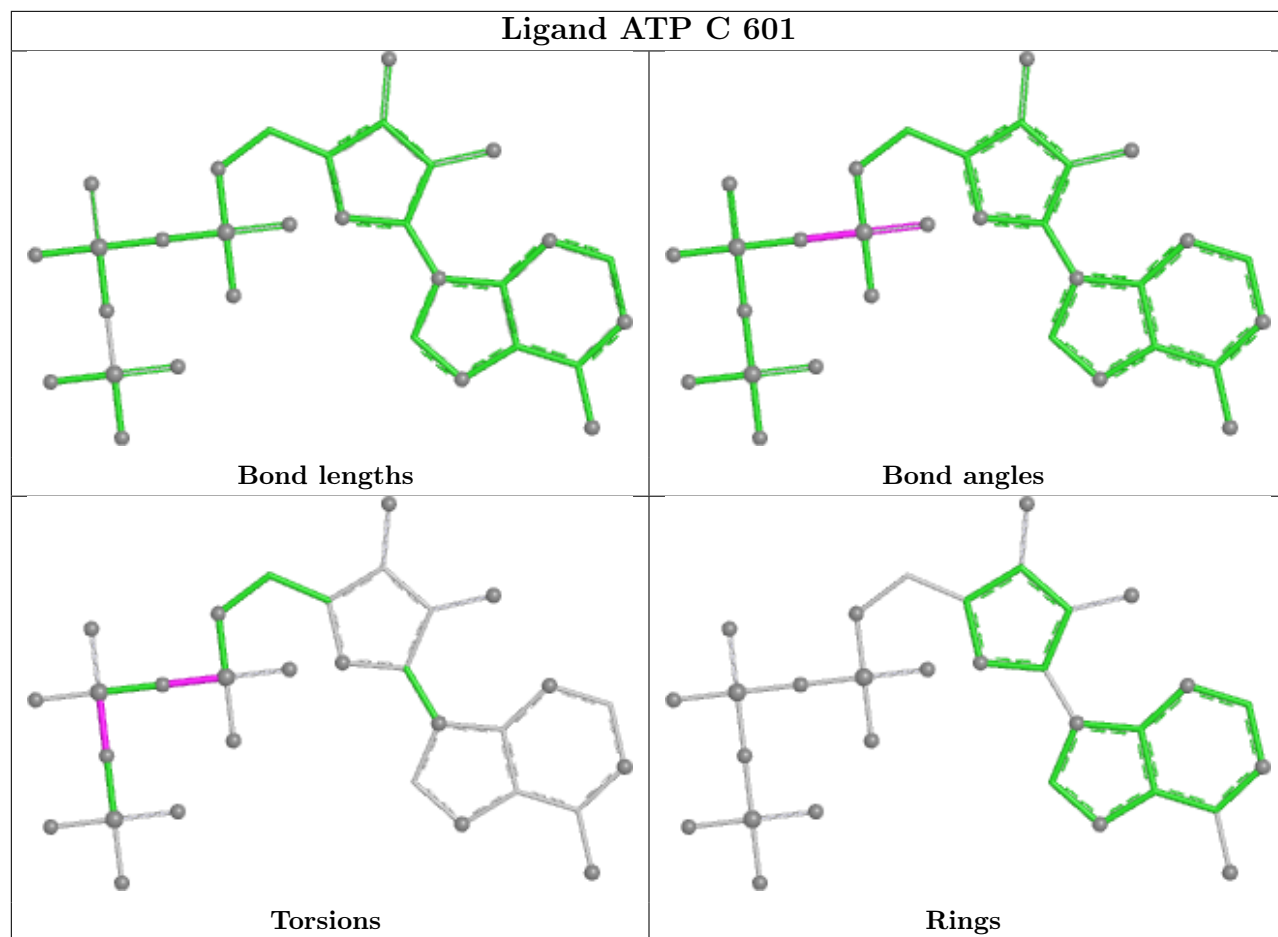




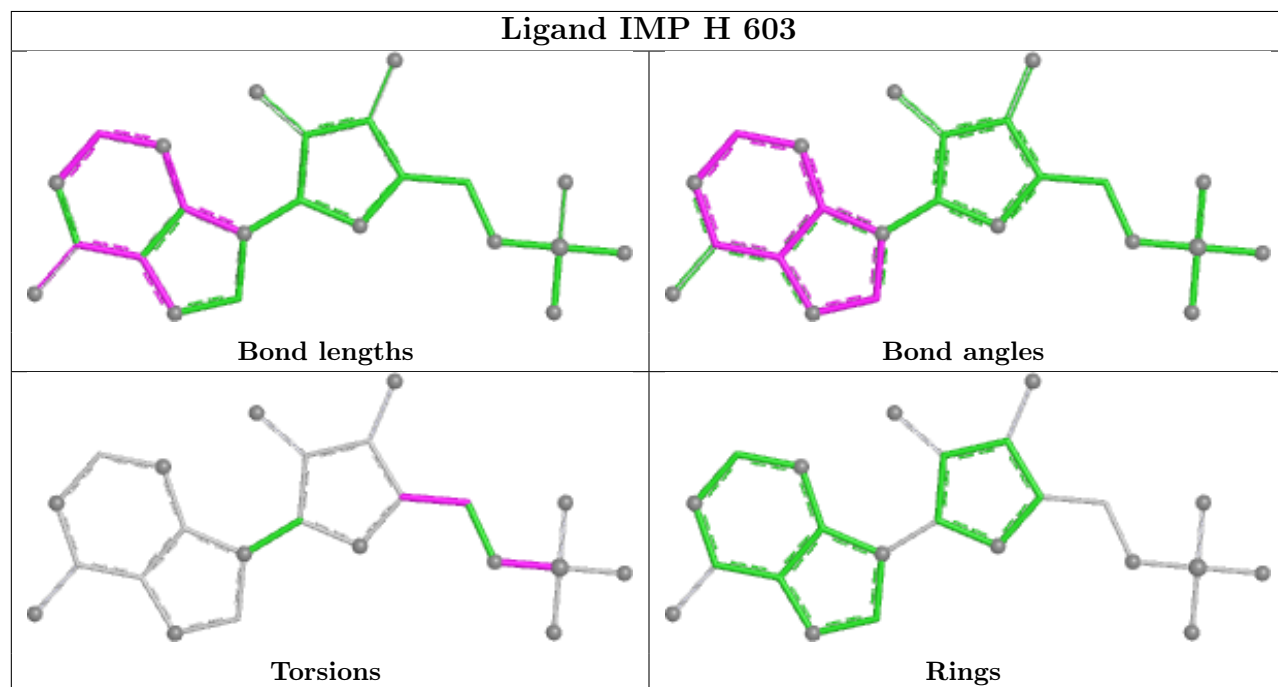


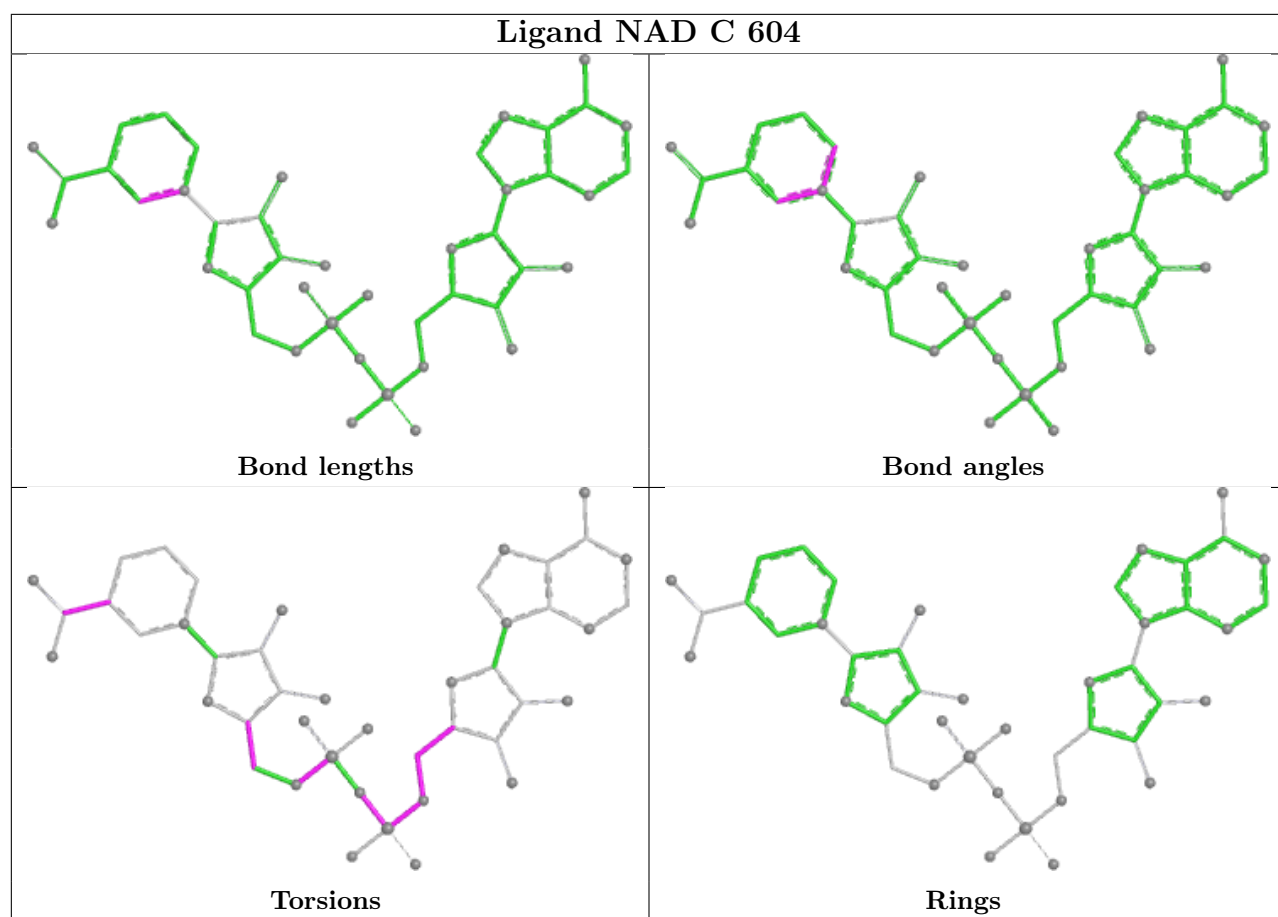


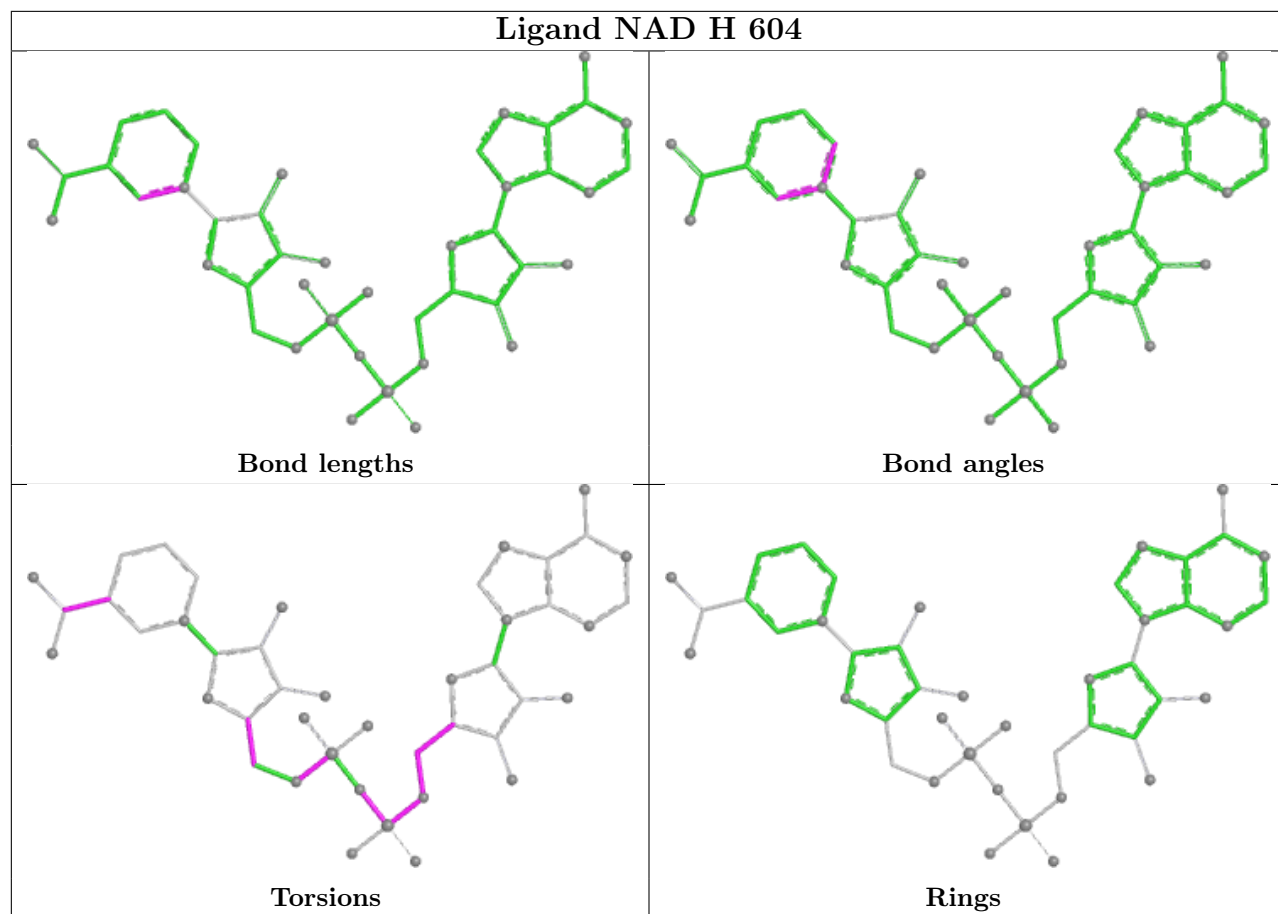
Ligand ATP C 601



Ligand IMP H 603







5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

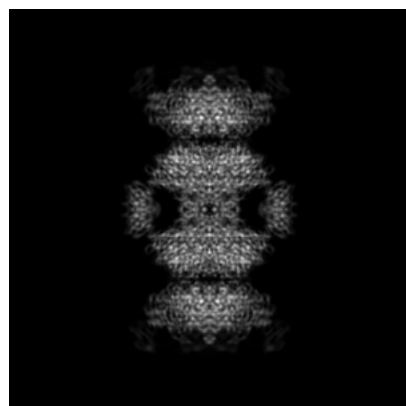
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-42026. These allow visual inspection of the internal detail of the map and identification of artifacts.

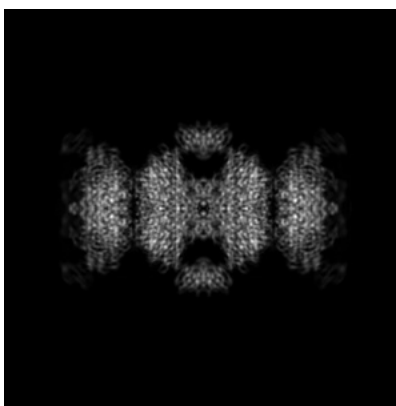
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

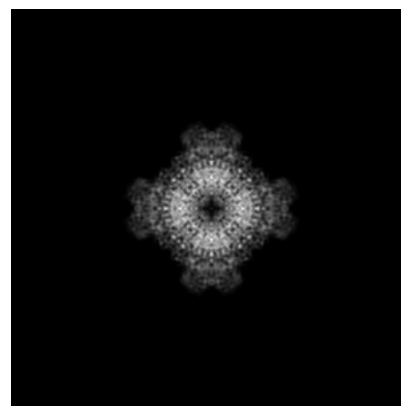
6.1.1 Primary map



X



Y

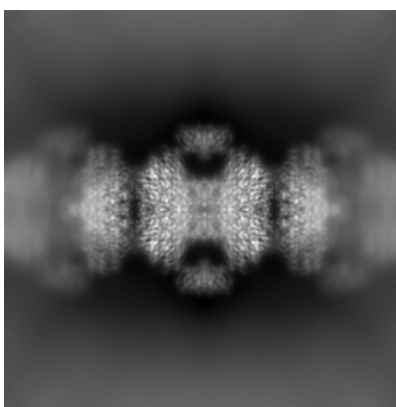


Z

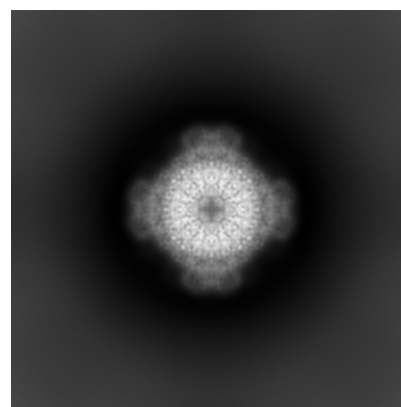
6.1.2 Raw map



X



Y

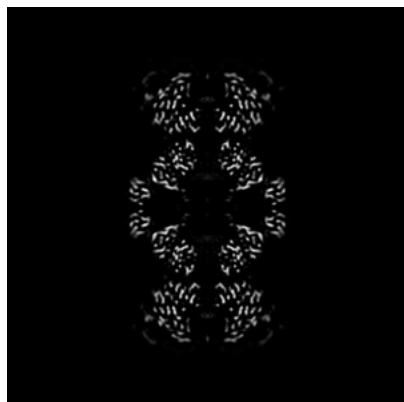


Z

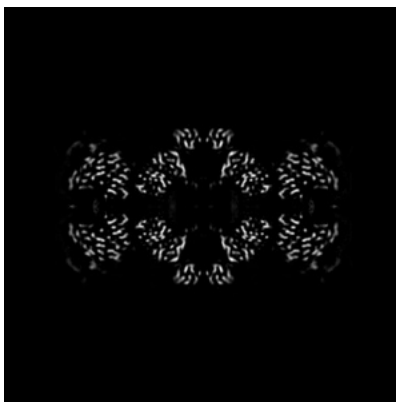
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

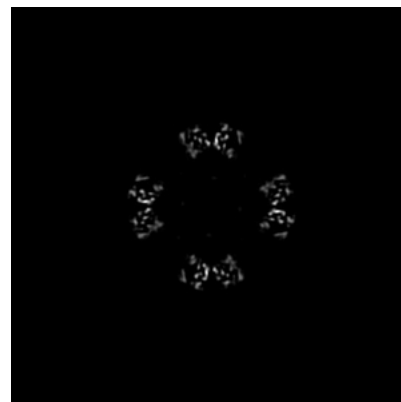
6.2.1 Primary map



X Index: 200

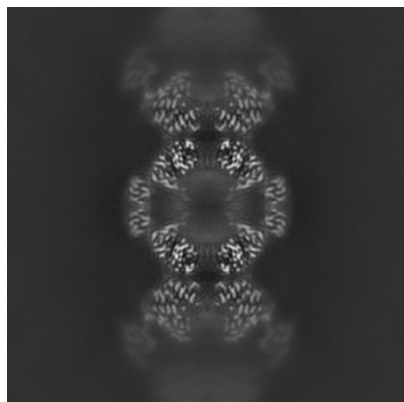


Y Index: 200

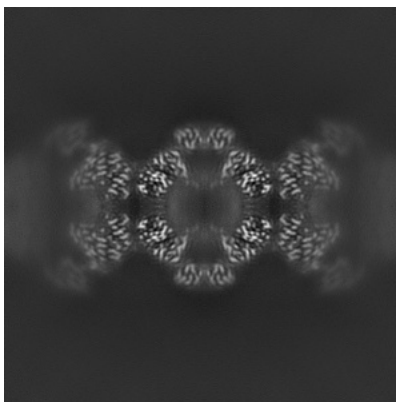


Z Index: 200

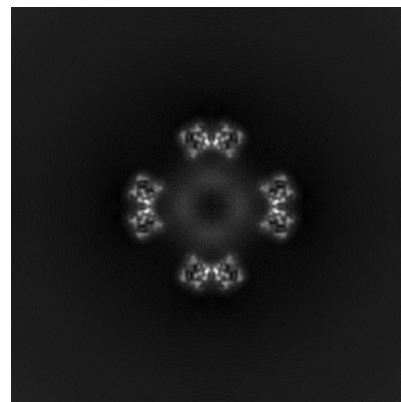
6.2.2 Raw map



X Index: 200



Y Index: 200

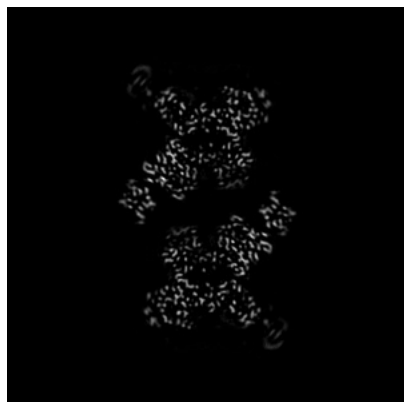


Z Index: 200

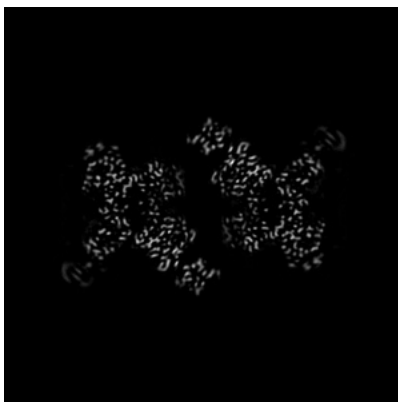
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

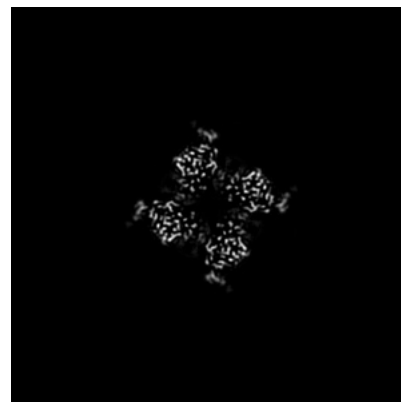
6.3.1 Primary map



X Index: 188

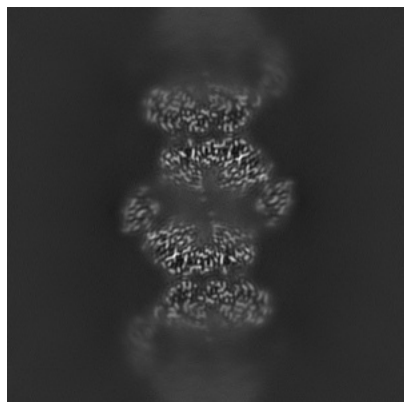


Y Index: 188

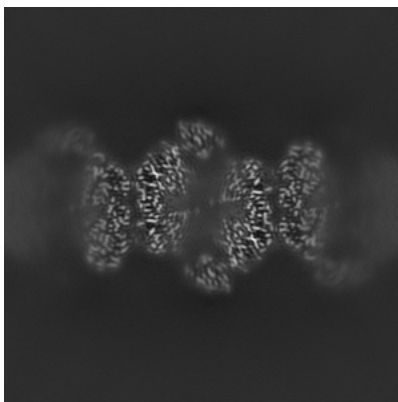


Z Index: 173

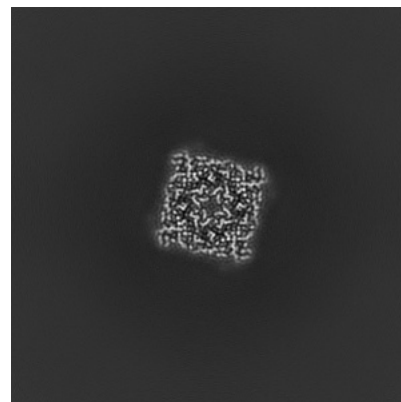
6.3.2 Raw map



X Index: 183



Y Index: 183

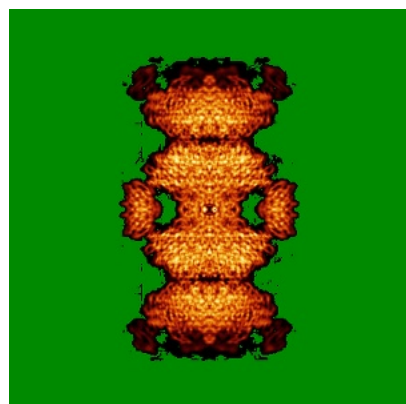


Z Index: 248

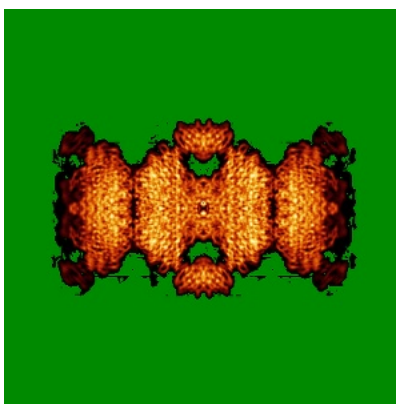
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) [i](#)

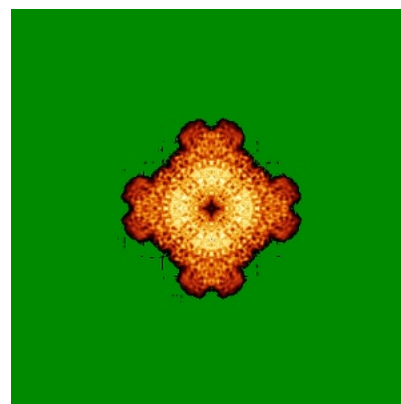
6.4.1 Primary map



X

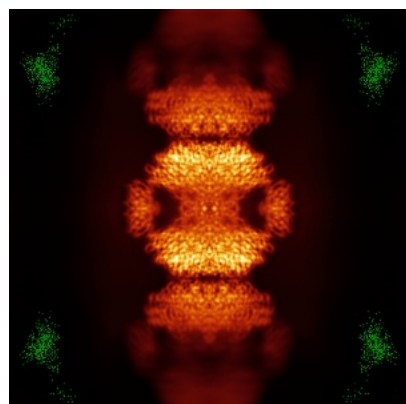


Y

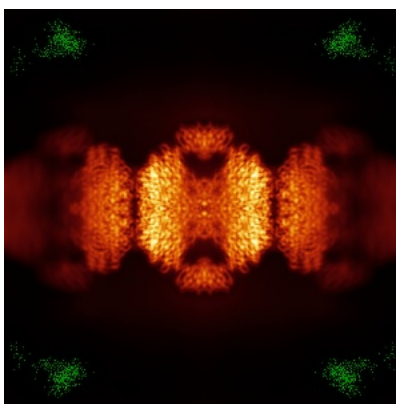


Z

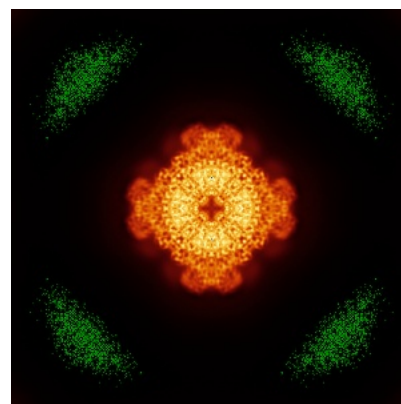
6.4.2 Raw map



X



Y

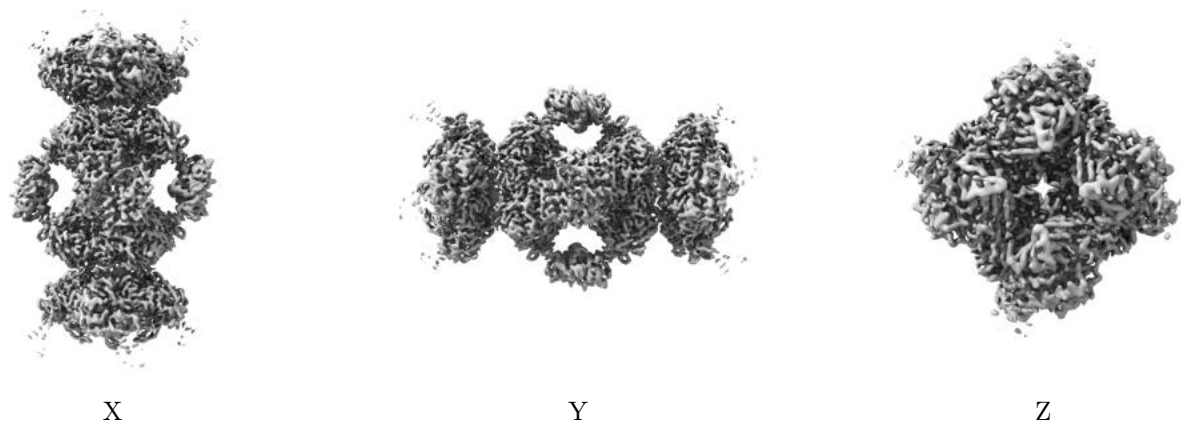


Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

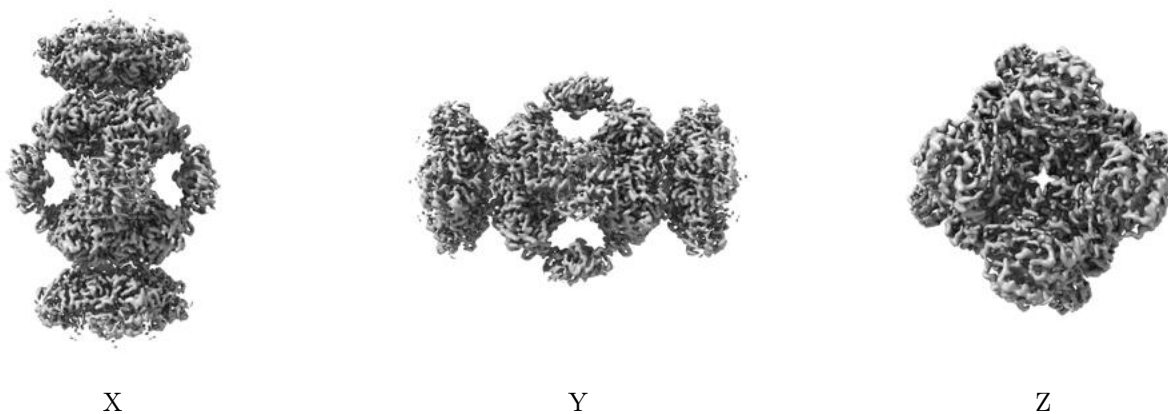
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.46. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

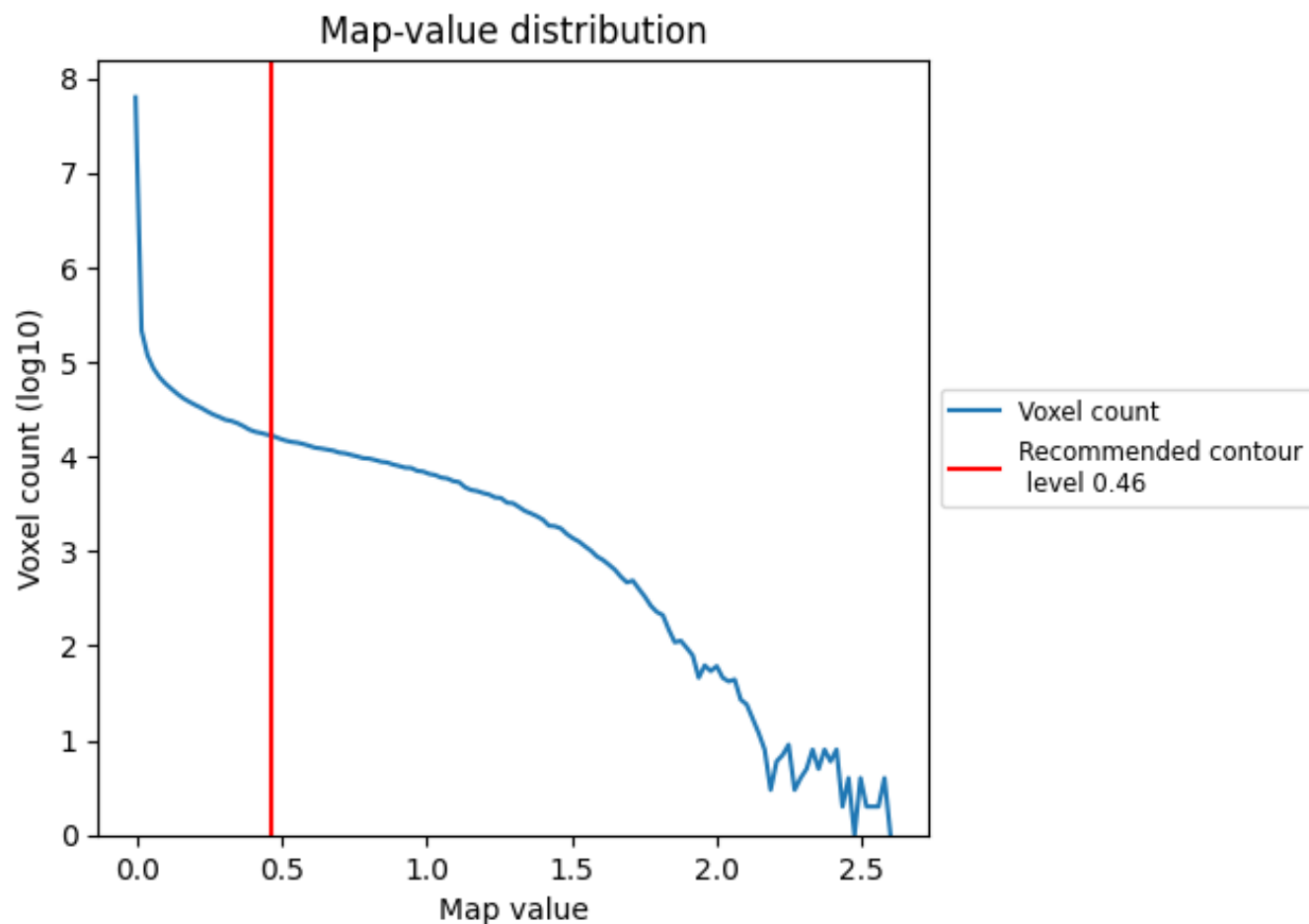
6.6 Mask visualisation [i](#)

This section was not generated. No masks/segmentation were deposited.

7 Map analysis [i](#)

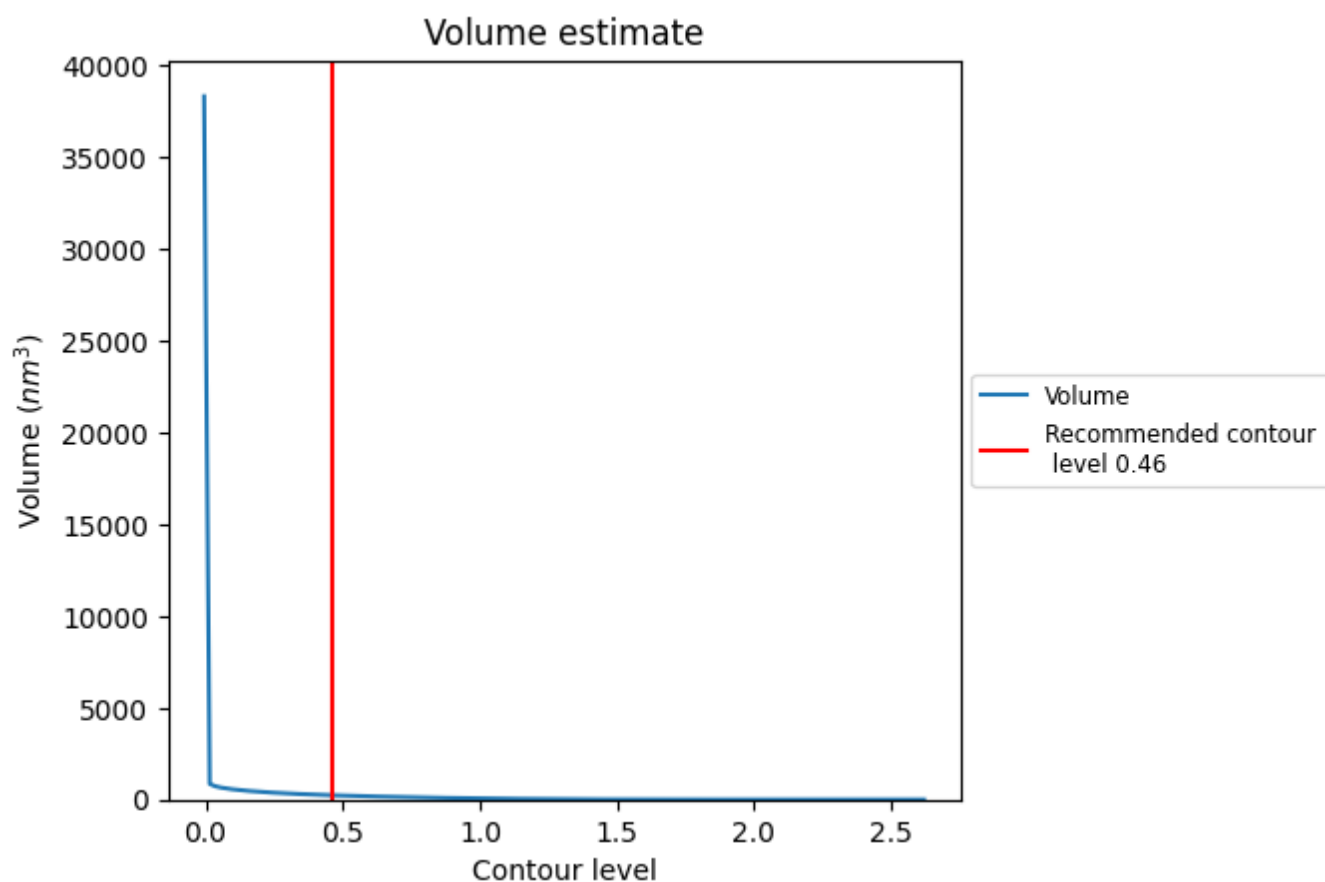
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

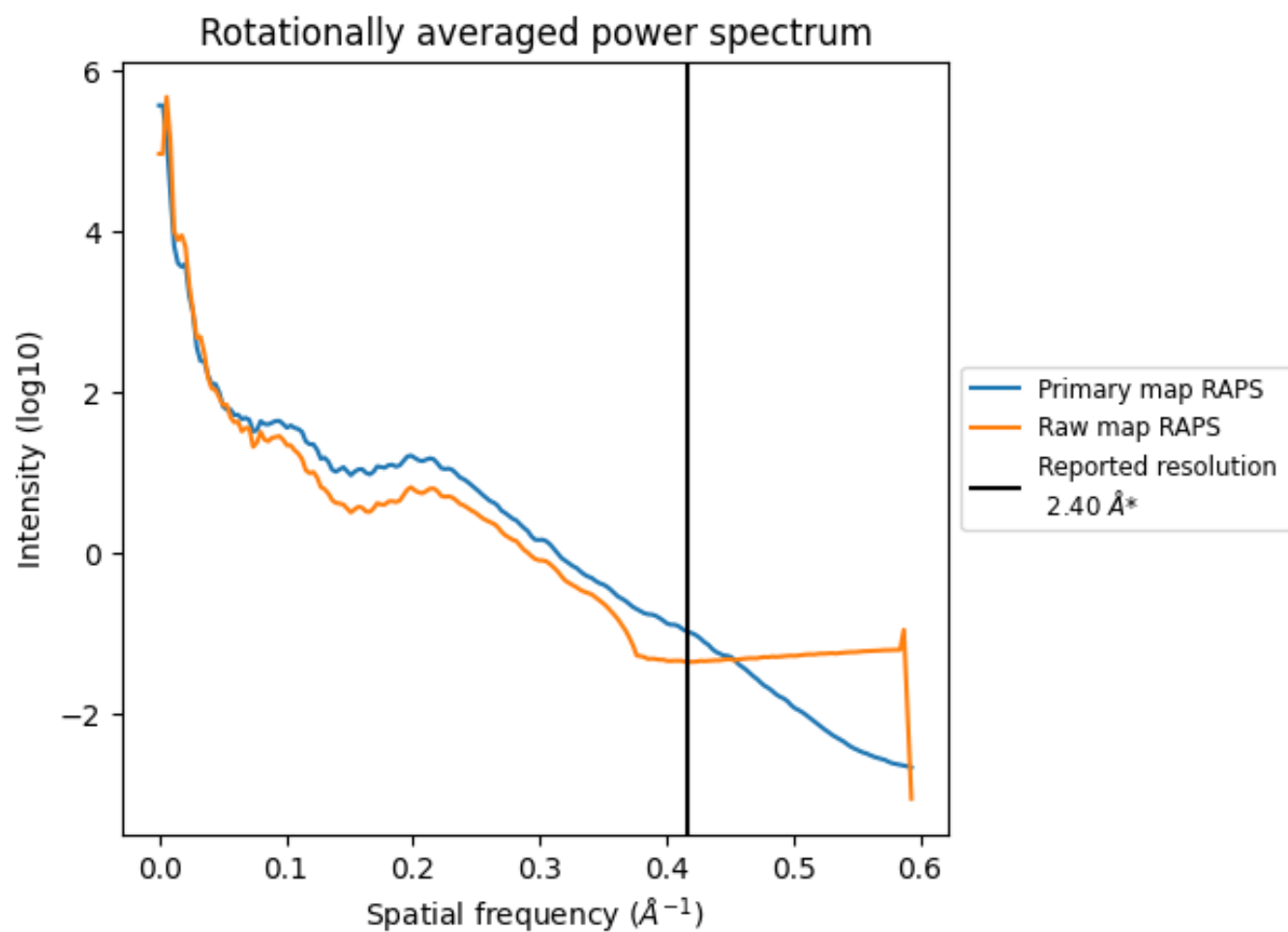
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 236 nm³; this corresponds to an approximate mass of 213 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum [i](#)

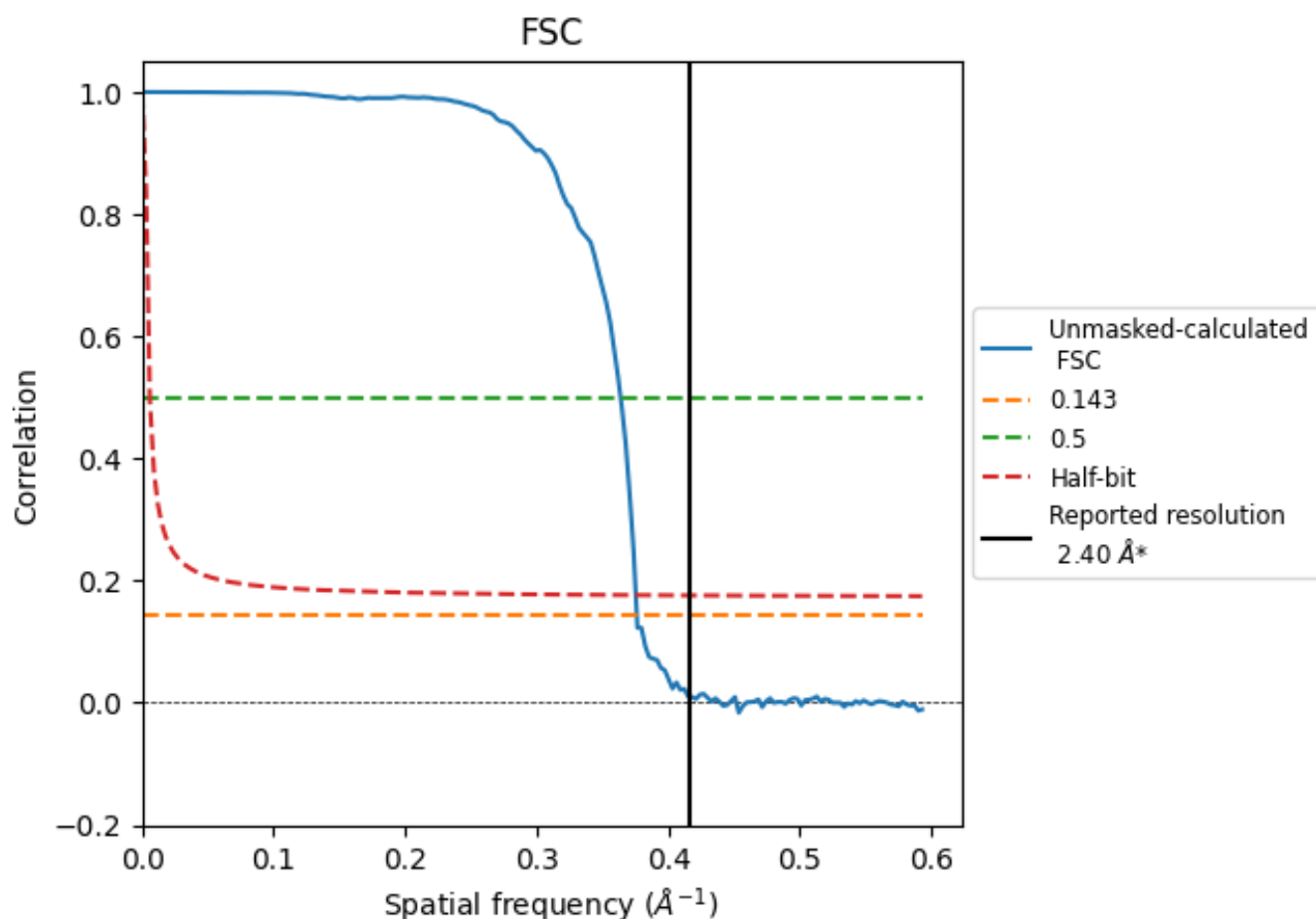


*Reported resolution corresponds to spatial frequency of 0.417 Å⁻¹

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of $0.417 \text{ \AA}^{-1}$

8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.40	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	2.66	2.75	2.66

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 2.66 differs from the reported value 2.4 by more than 10 %

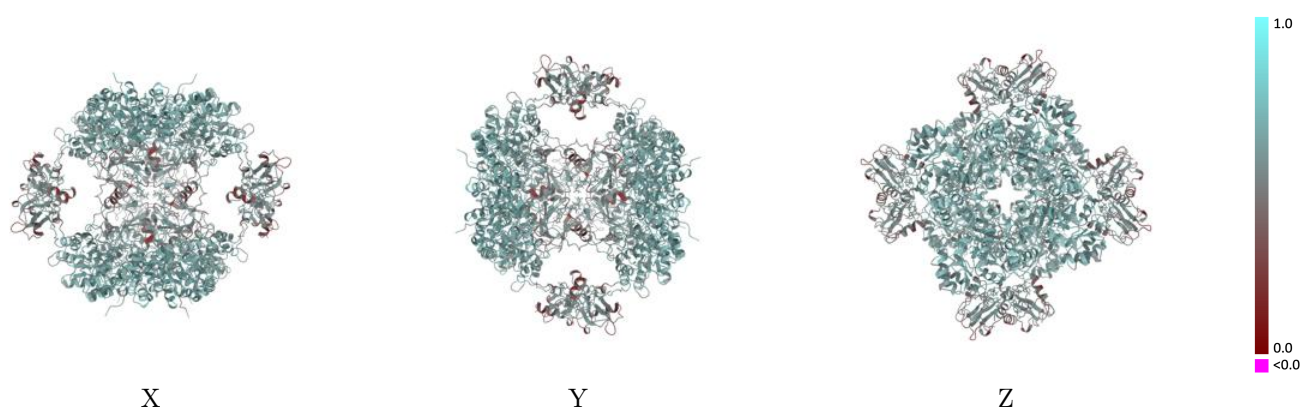
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-42026 and PDB model 8U8O. Per-residue inclusion information can be found in section 3 on page 16.

9.1 Map-model overlay [i](#)

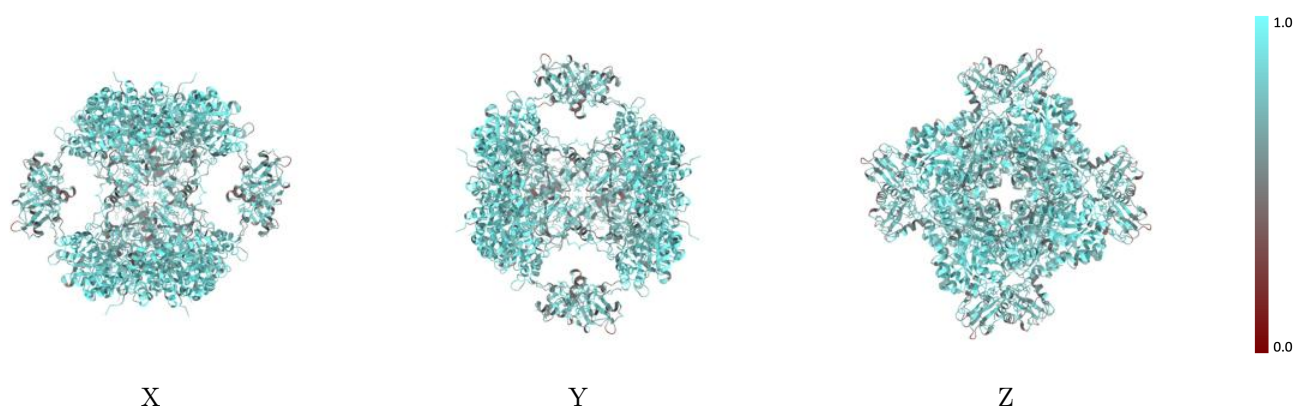
This section was not generated.

9.2 Q-score mapped to coordinate model [i](#)



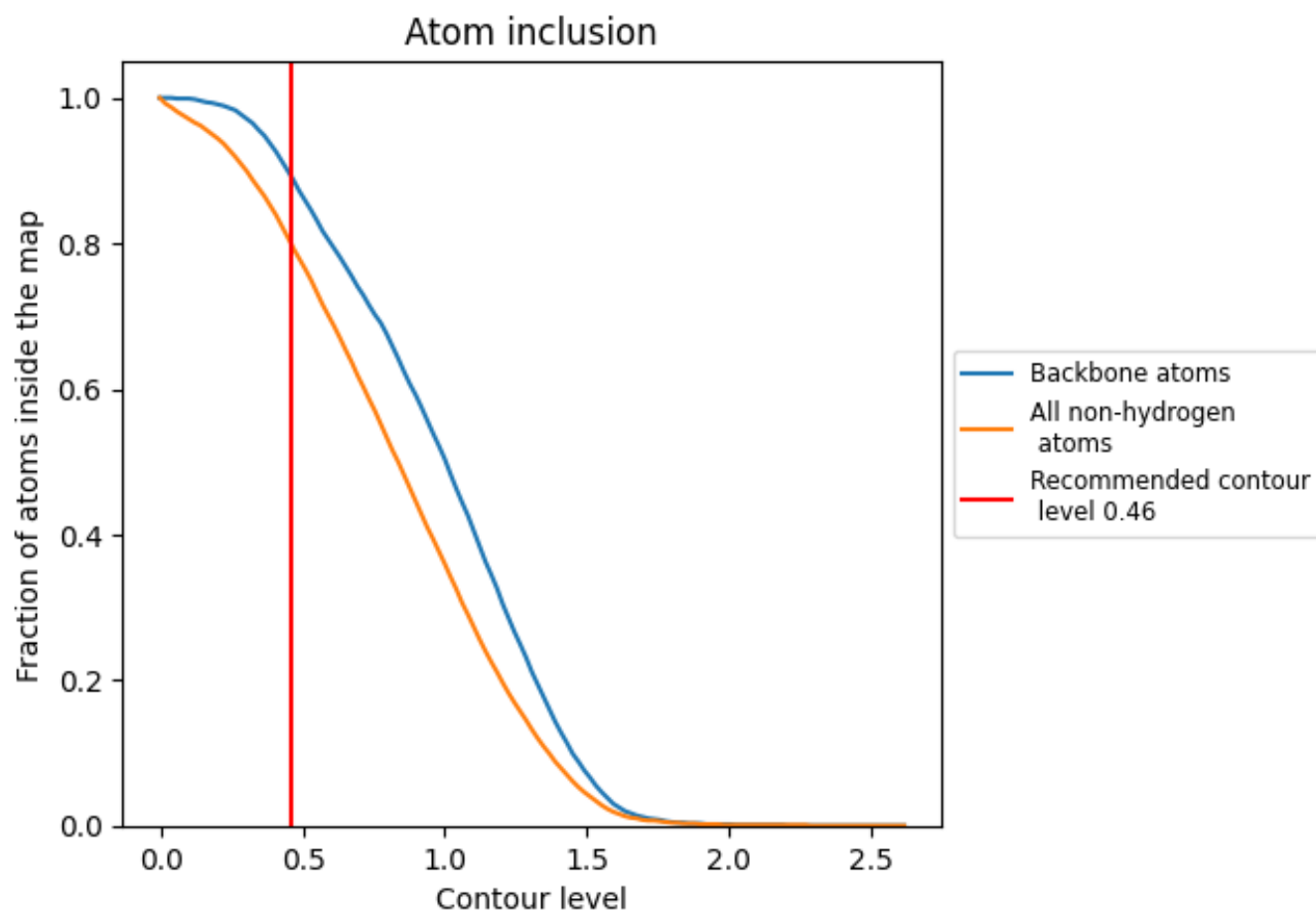
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.46).

9.4 Atom inclusion [i](#)



At the recommended contour level, 89% of all backbone atoms, 80% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.46) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7980	0.5850
A	0.7930	0.5840
B	0.7940	0.5860
C	0.7990	0.5870
D	0.7990	0.5840
E	0.7960	0.5850
F	0.8030	0.5860
G	0.8020	0.5860
H	0.7980	0.5850

1.0

0.0

<0.0