



## wwPDB EM Validation Summary Report ⓘ

Jul 7, 2024 – 06:46 pm BST

PDB ID : 7PT7  
EMDB ID : EMD-13620  
Title : Structure of MCM2-7 DH complexed with Cdc7-Dbf4 in the presence of ADP:BeF3, state I  
Authors : Saleh, A.; Noguchi, Y.; Aramayo, R.; Ivanova, M.E.; Speck, C.  
Deposited on : 2021-09-26  
Resolution : 3.80 Å(reported)

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We welcome your comments at [validation@mail.wwpdb.org](mailto: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>.

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

EMDB validation analysis : 0.0.1.dev92  
Mogul : 1.8.4, CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.37.1

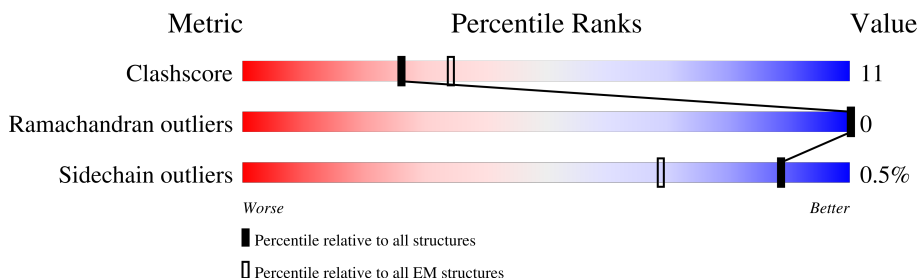
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.80 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.



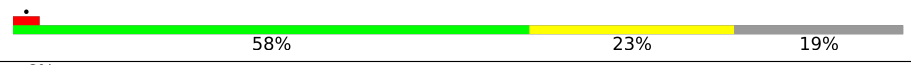
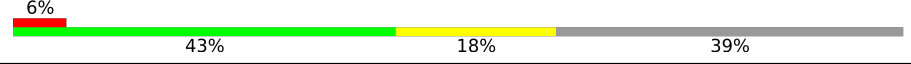
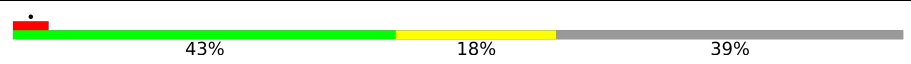
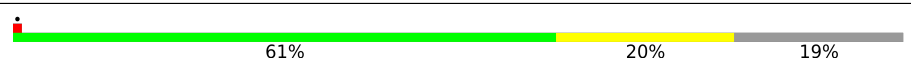
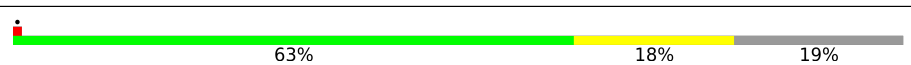
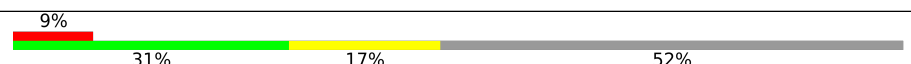
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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  $\geq 3$ , 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	1	4	100% 100%
2	2	868	7% 52% 20% 28%
2	B	868	8% 51% 21% 28%
3	3	971	• 50% 15% 35%
3	C	971	• 52% 13% 35%
4	4	933	• 53% 18% 28%
4	D	933	• 53% 18% 28%
5	5	775	• 61% 20% 19%

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Mol	Chain	Length	Quality of chain
5	E	775	
6	6	1017	
6	F	1017	
7	7	845	
7	G	845	
8	8	507	
9	9	704	

## 2 Entry composition [i](#)

There are 13 unique types of molecules in this entry. The entry contains 67420 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 Undefined Mcm4 flexible N-terminal tail.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
1	1	4	20	12	4	4	0	0

- Molecule 2 is a protein called DNA replication licensing factor MCM2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	2	626	4960	3124	880	937	19	0	0
2	B	626	4960	3124	880	937	19	0	0

- Molecule 3 is a protein called DNA replication licensing factor MCM3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	3	635	4986	3152	885	936	13	0	0
3	C	633	4966	3141	880	932	13	0	0

- Molecule 4 is a protein called DNA replication licensing factor MCM4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	4	668	5323	3341	920	1033	29	0	0
4	D	668	5323	3341	920	1033	29	0	0

- Molecule 5 is a protein called Minichromosome maintenance protein 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	5	628	4927	3098	844	962	23	0	0

*Continued on next page...*

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Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E	628	4927	3098	844	962	23	0	0

- Molecule 6 is a protein called DNA replication licensing factor MCM6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	6	617	4889	3083	850	931	25	0	0
6	F	617	4889	3083	850	931	25	0	0

- Molecule 7 is a protein called DNA replication licensing factor MCM7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	7	683	5370	3382	924	1034	30	0	0
7	G	683	5370	3382	924	1034	30	0	0

- Molecule 8 is a protein called Cell division control protein 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	8	402	3292	2126	551	599	16	0	0

- Molecule 9 is a protein called DDK kinase regulatory subunit DBF4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	9	337	2813	1793	494	514	12	0	0

- Molecule 10 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula:  $C_{10}H_{15}N_5O_{10}P_2$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
10	2	1	Total 27	10	5	10	2	0
10	3	1	Total 27	10	5	10	2	0
10	4	1	Total 27	10	5	10	2	0
10	5	1	Total 27	10	5	10	2	0
10	6	1	Total 27	10	5	10	2	0
10	7	1	Total 27	10	5	10	2	0
10	8	1	Total 27	10	5	10	2	0
10	B	1	Total 27	10	5	10	2	0
10	C	1	Total 27	10	5	10	2	0
10	D	1	Total 27	10	5	10	2	0
10	E	1	Total 27	10	5	10	2	0
10	F	1	Total 27	10	5	10	2	0
10	G	1	Total 27	10	5	10	2	0

- Molecule 11 is MAGNESIUM ION (three-letter code: MG) (formula: Mg) (labeled as "Lig-

and of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
11	2	1	Total 1	Mg 1	0
11	3	1	Total 1	Mg 1	0
11	4	1	Total 1	Mg 1	0
11	5	1	Total 1	Mg 1	0
11	6	1	Total 1	Mg 1	0
11	7	1	Total 1	Mg 1	0
11	8	2	Total 2	Mg 2	0
11	B	1	Total 1	Mg 1	0
11	C	1	Total 1	Mg 1	0
11	D	1	Total 1	Mg 1	0
11	E	1	Total 1	Mg 1	0
11	F	1	Total 1	Mg 1	0
11	G	1	Total 1	Mg 1	0

- Molecule 12 is ZINC ION (three-letter code: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

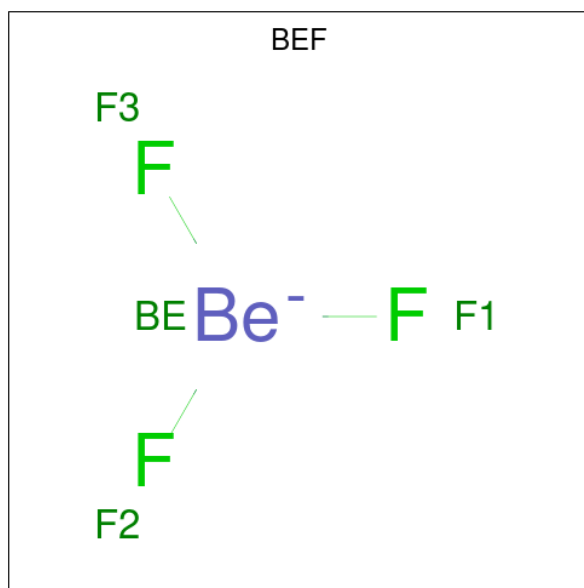
Mol	Chain	Residues	Atoms		AltConf
12	2	1	Total 1	Zn 1	0
12	4	1	Total 1	Zn 1	0
12	5	1	Total 1	Zn 1	0
12	6	1	Total 1	Zn 1	0
12	7	1	Total 1	Zn 1	0

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Mol	Chain	Residues	Atoms		AltConf
12	8	1	Total 1	Zn 1	0
12	9	1	Total 1	Zn 1	0
12	B	1	Total 1	Zn 1	0
12	D	1	Total 1	Zn 1	0
12	E	1	Total 1	Zn 1	0
12	F	1	Total 1	Zn 1	0
12	G	1	Total 1	Zn 1	0

- Molecule 13 is BERYLLIUM TRIFLUORIDE ION (three-letter code: BEF) (formula: BeF<sub>3</sub>) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			AltConf
13	3	1	Total 4	Be 1	F 3	0
13	3	1	Total 4	Be 1	F 3	0
13	4	1	Total 4	Be 1	F 3	0
13	8	1	Total 4	Be 1	F 3	0

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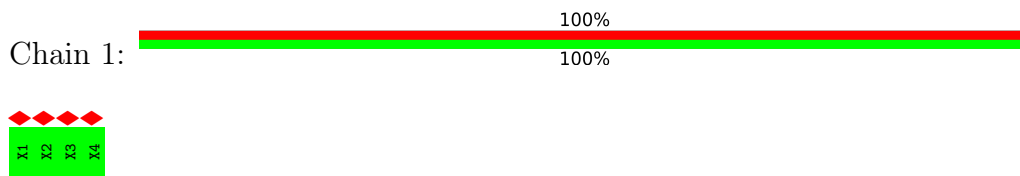
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Mol	Chain	Residues	Atoms			AltConf
			Total	Be	F	
13	D	1	4	1	3	0
13	E	1	4	1	3	0
13	G	1	4	1	3	0

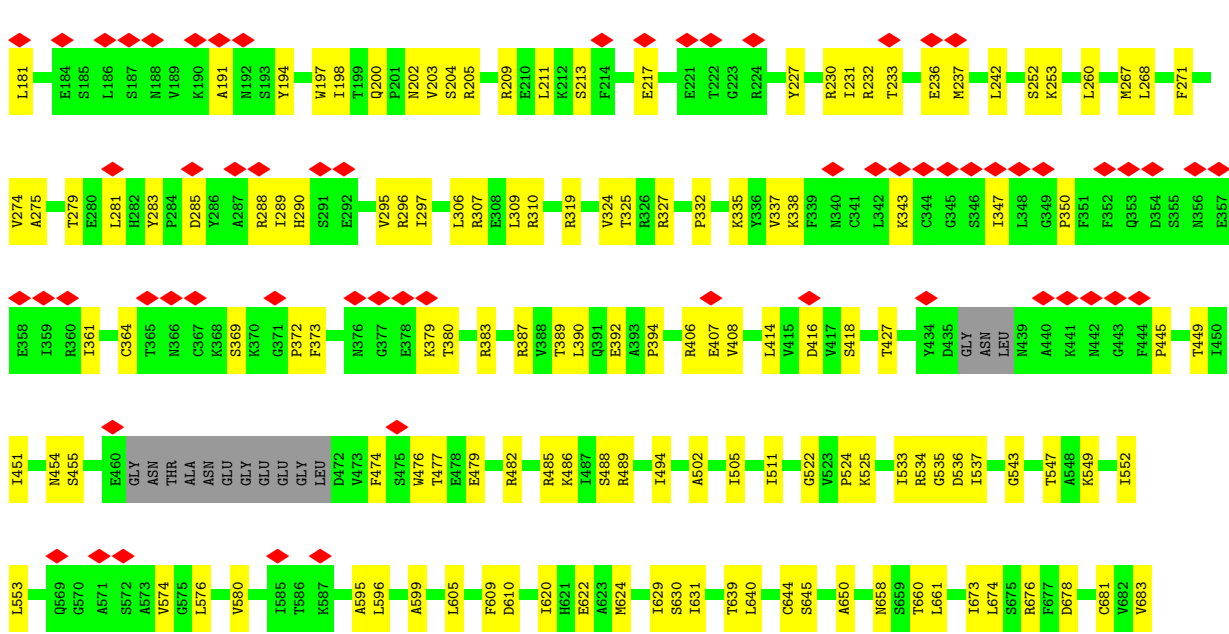
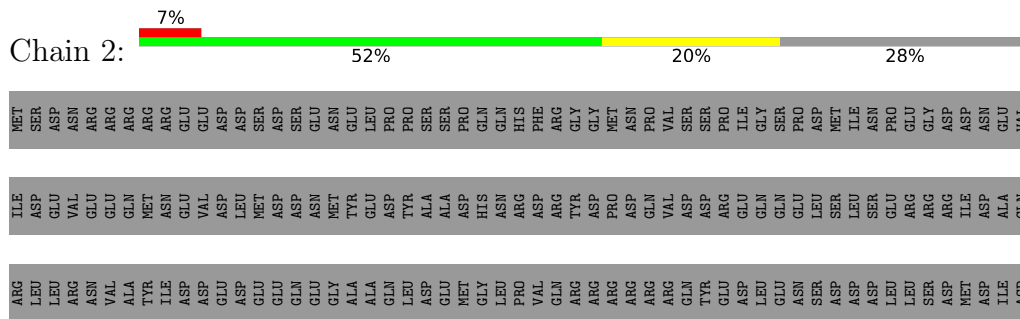
### 3 Residue-property plots i

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and 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.

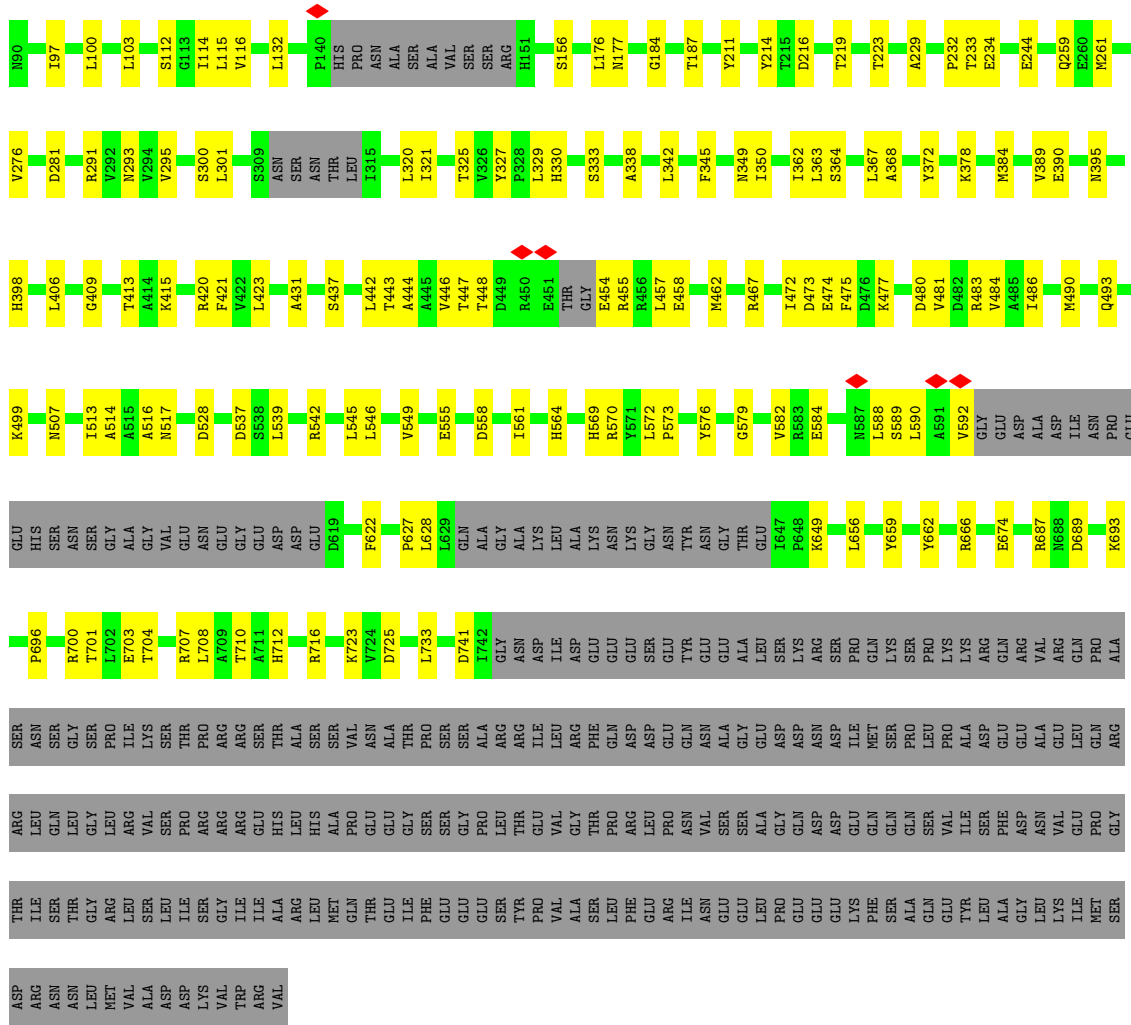
- Molecule 1: Undefined Mcm4 flexible N-terminal tail



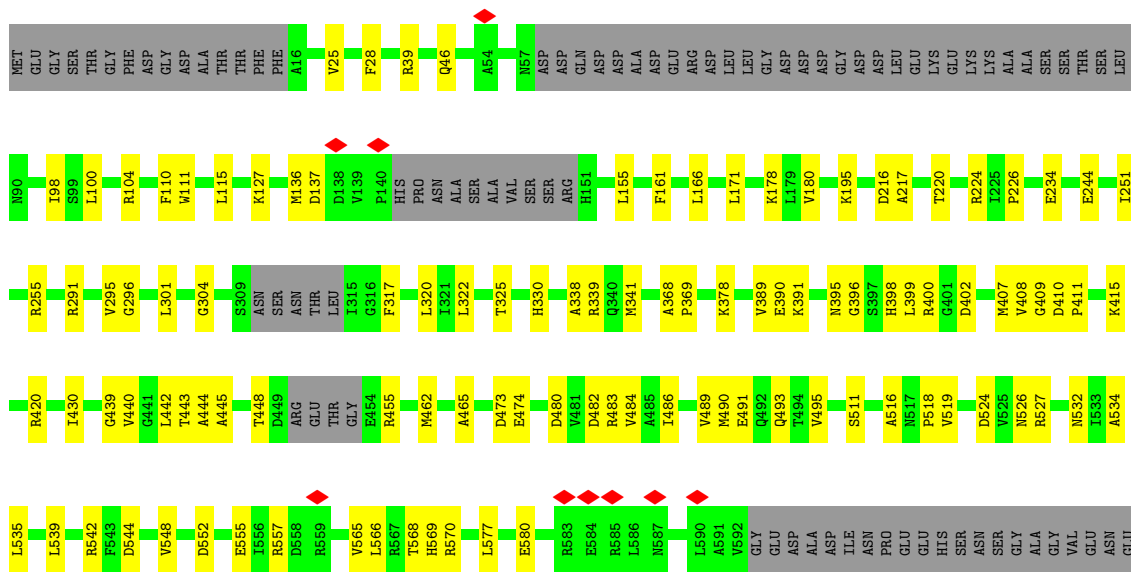
- Molecule 2: DNA replication licensing factor MCM2





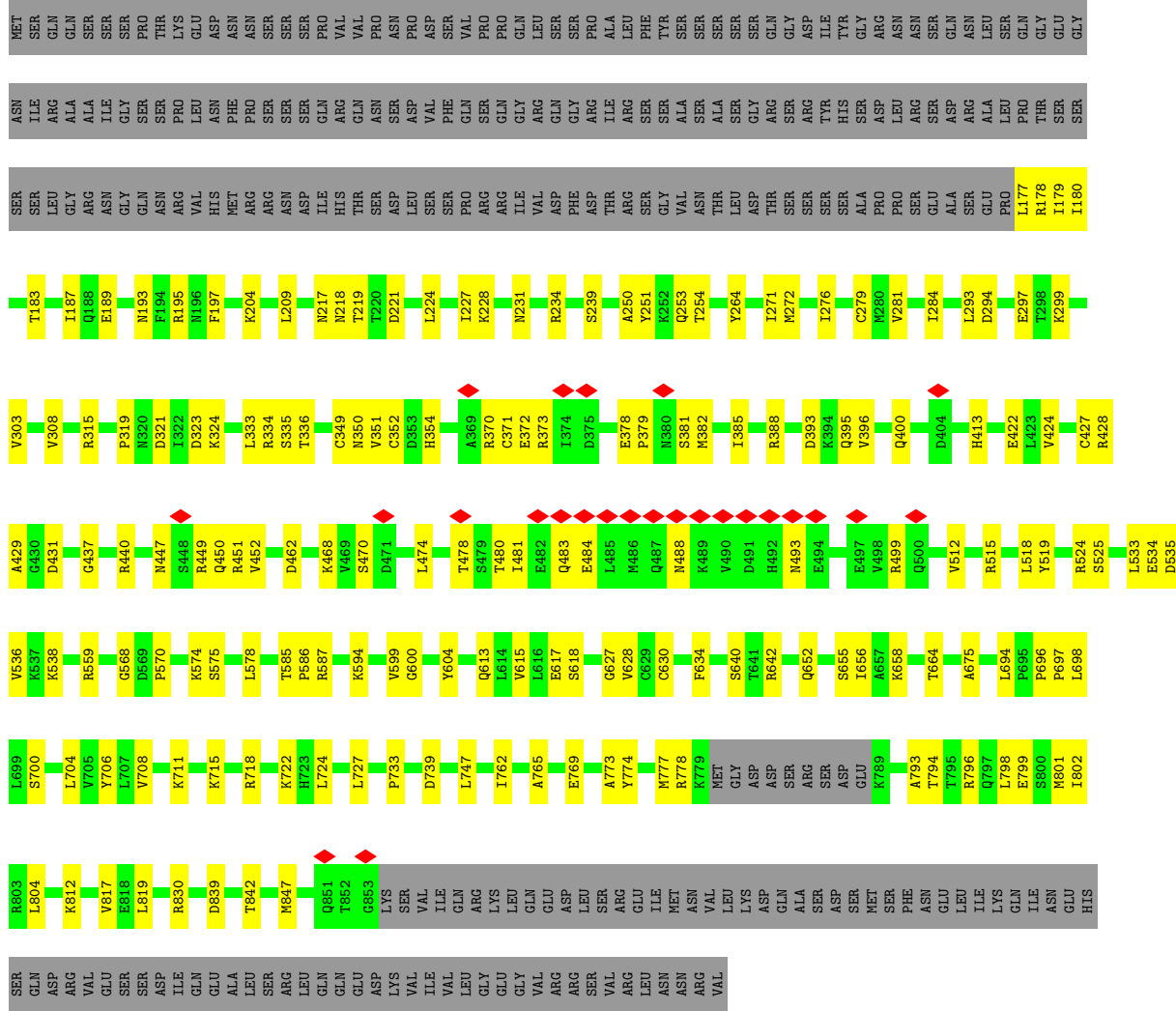


● Molecule 3: DNA replication licensing factor MCM3

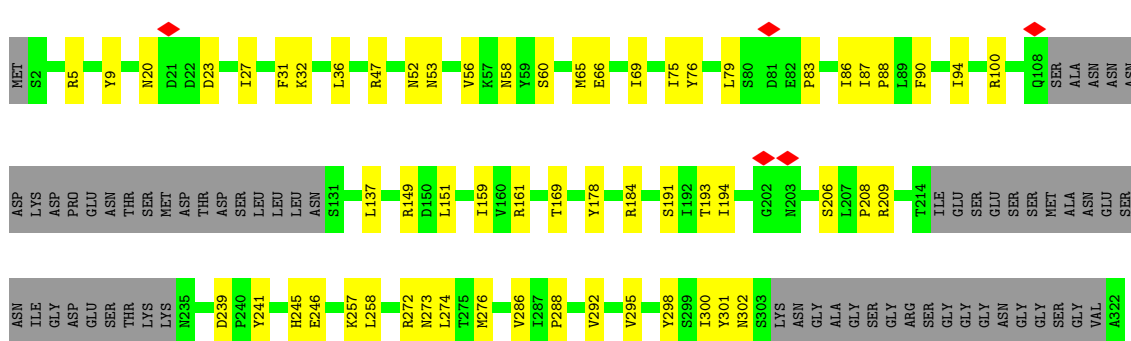


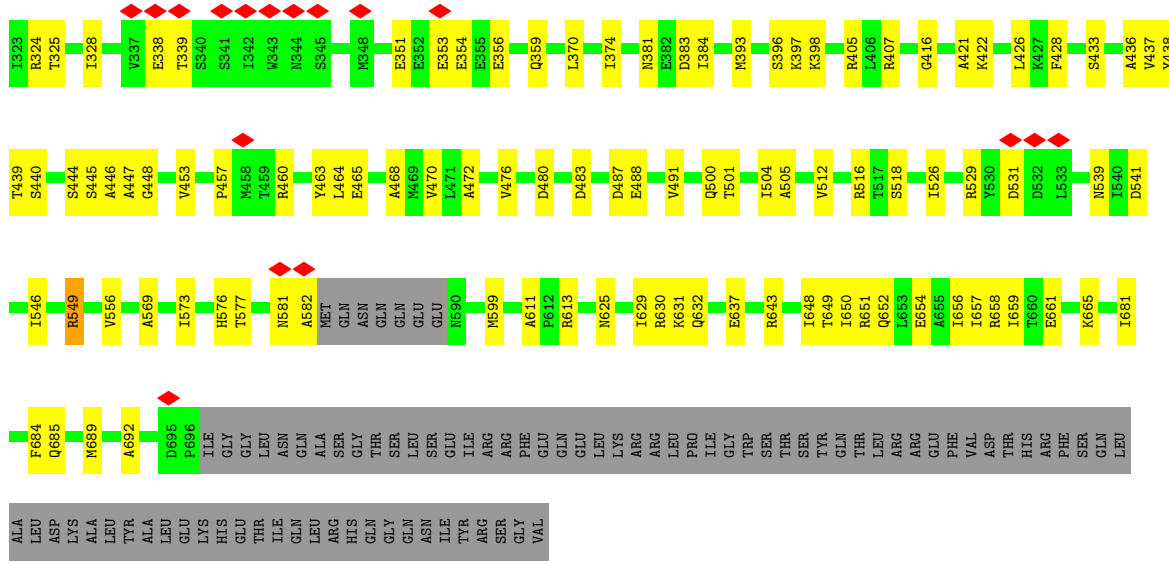


• Molecule 4: DNA replication licensing factor MCM4

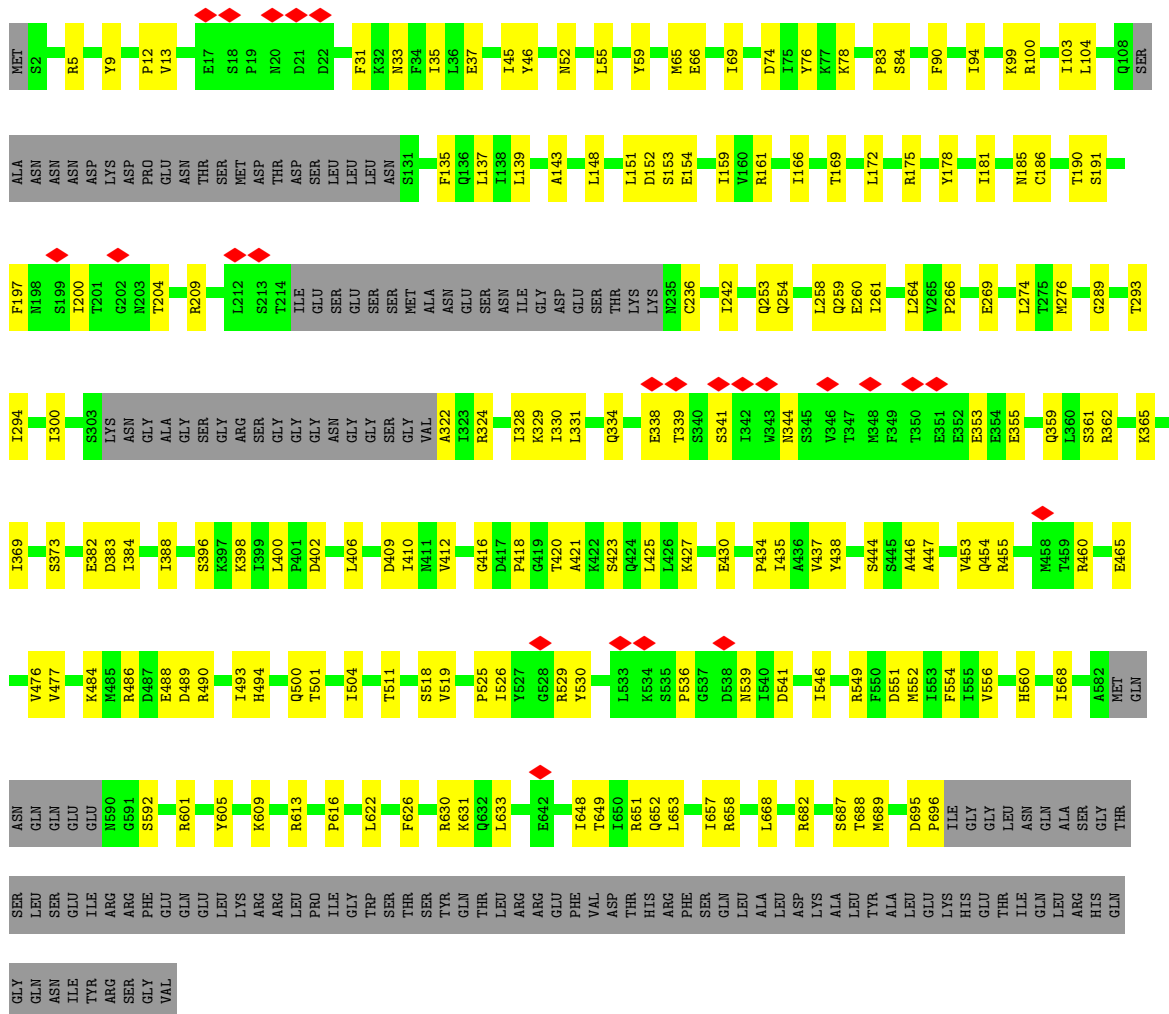


• Molecule 5: Minichromosome maintenance protein 5

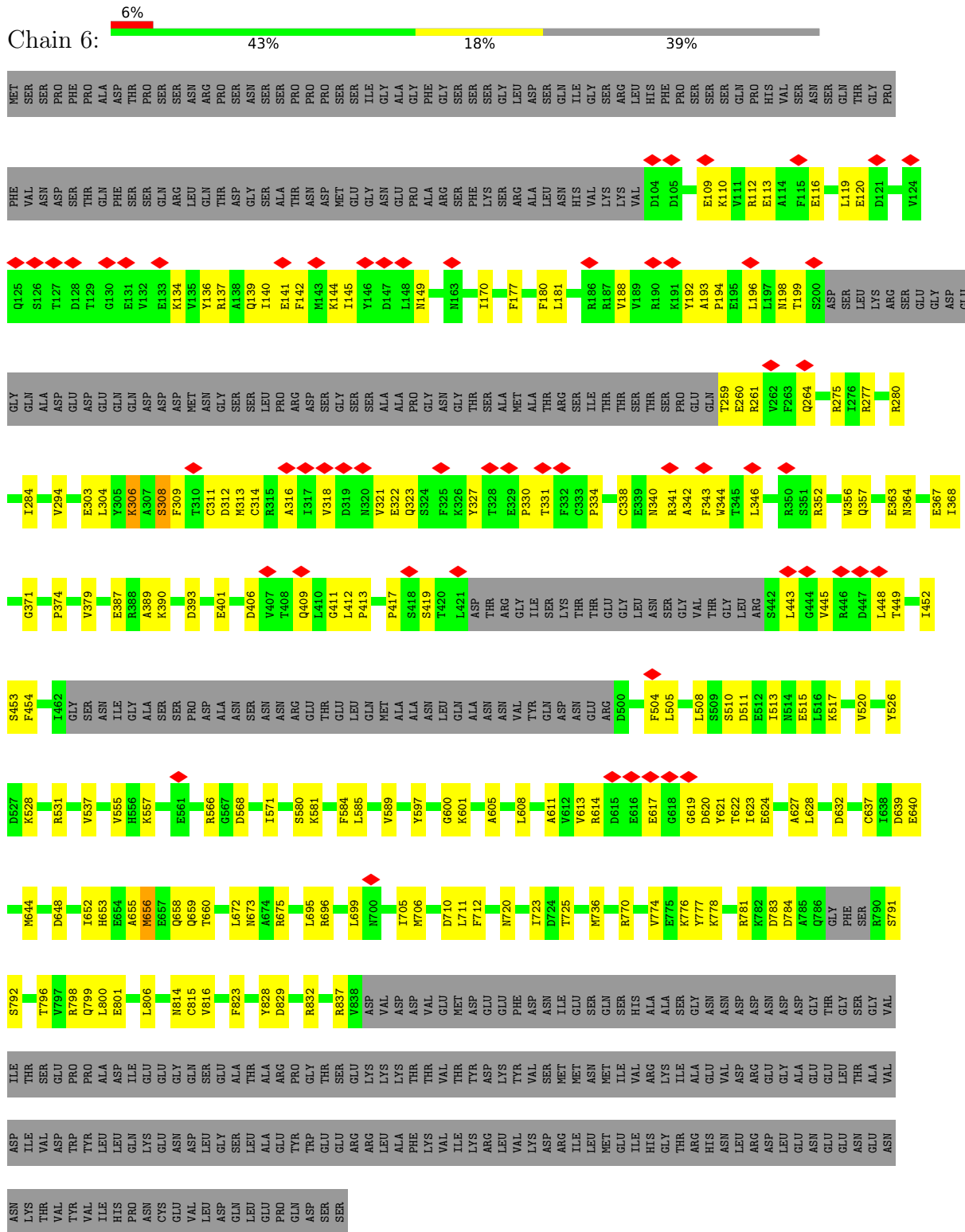




Molecule 5: Minichromosome maintenance protein 5



Molecule 6: DNA replication licensing factor MCM6



Molecule 6: DNA replication licensing factor MCM6





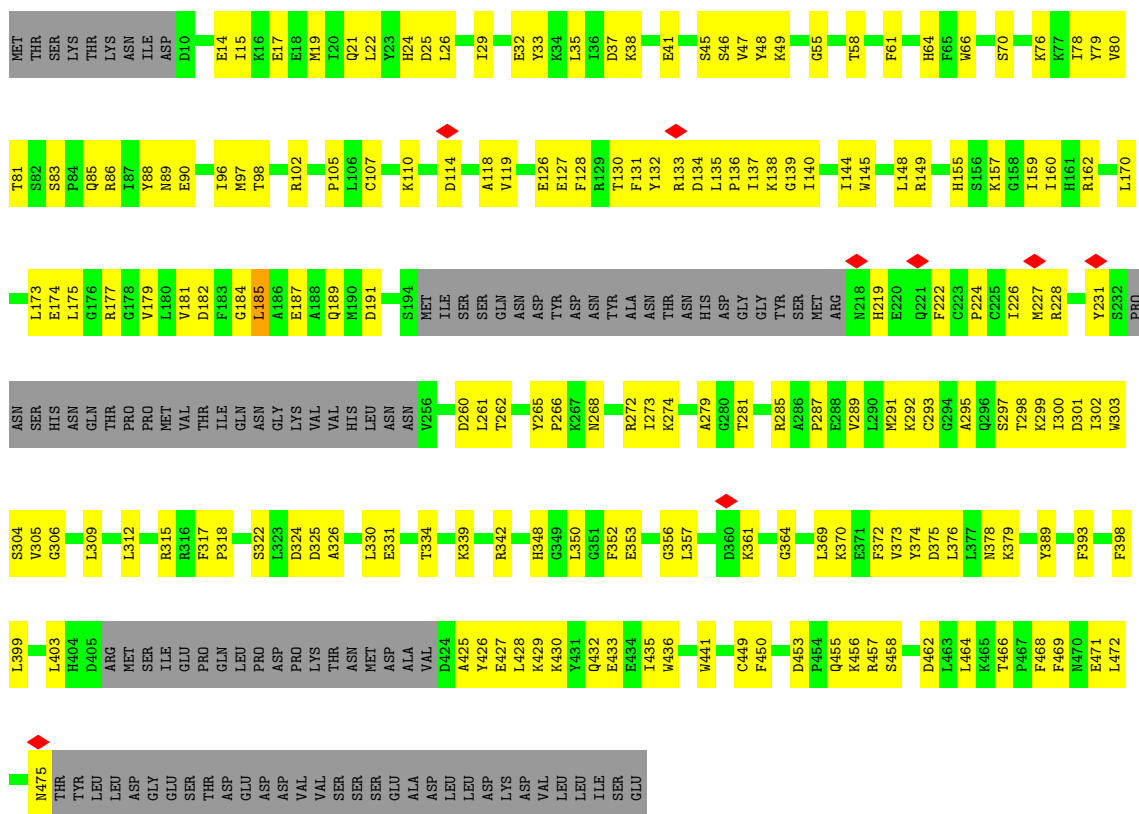




LYS	LEU	ALA	PRO	GLN	THR	THR	THR	ALA	SER	ASN	ALA	VAL	SER	GLN	ASP	ALA
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

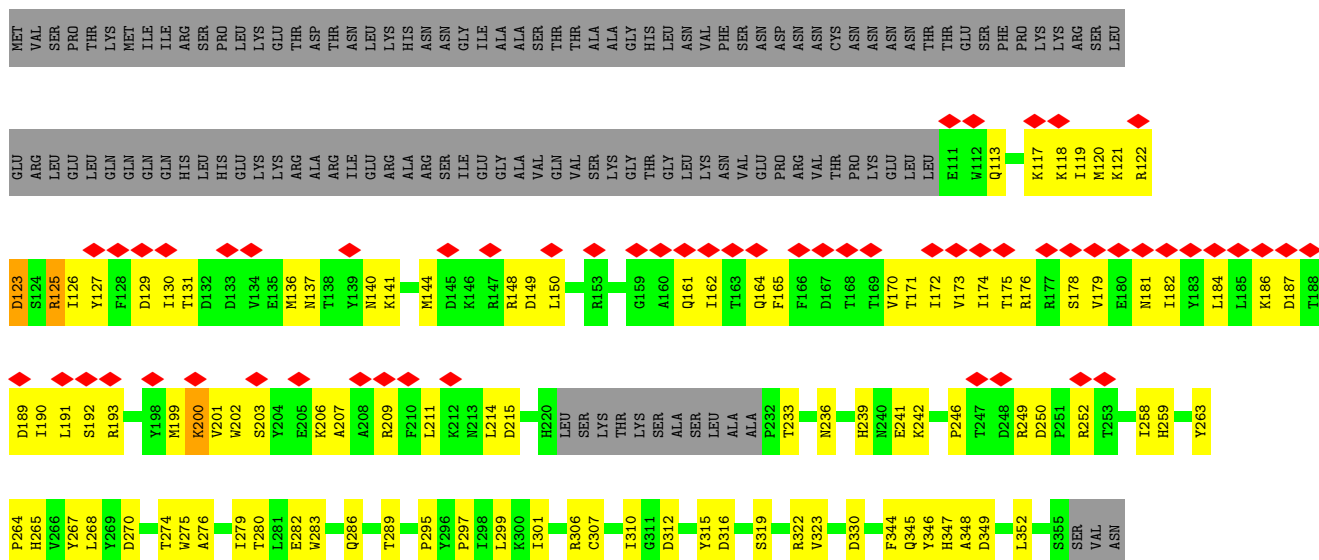
● Molecule 8: Cell division control protein 7

Chain 8: 44% 36% 21%



● Molecule 9: DDK kinase regulatory subunit DBF4

Chain 9: 9% 31% 17% 52%



ASP	GLU	ASN	GLY	THR	GLN	ASP	THR	K362	H369	N372	K376	K387	ASN	PHE	GLU	LYS	THR	ASP	ASP	SER	ALA	VAL	GLN	ASP	VAL	ARG	ASN	GLU	HIS	ALA	ASP	GLN	THR	ASP	GLU	LYS	ASN	SER	ILE	LEU	LEU	ASN	THR	GLU	THR	GLU	PRO	PRO	LEU	LYS	GLU	LYS																				
GLU	ASN	LYS	GLN	SER	ILE	ALA	GLU	SER	ASN	VAL	ASN	LYS	TYR	PRO	GLN	ARG	LYS	GLU	LEU	ALA	ALA	ALA	THR	PRO	LYS	ASN	ALA	HIS	VAL	VAL	GLY	ALA	THR	PHE	ALA	ARG	GLN	GLY	THR	GLU	VAL	PRO	ASP	ASP	ILE	LEU	CYS	THR	THR	LYS	LYS	THR	GLU	ARG	GLN	ALA	PHE	ALA	GLU	ILE	LYS	ALA										
SER	GLY	ALA	HIS	SER	SER	ASN	ASP	VAL	ALA	THR	ASP	PHE	K509	N510	G511	L512	K525	R534	K535	L536	G537	V538	LYS	GLN	THR	ASN	GLY	ASN	ASN	LYS	ALA	ASN	TYR	GLN	THR	ALA	THR	THR	ILE	ALA	ASP	THR	ALA	GLU	THR	THR	LYS	SER	THR	LYS	GLU	ASN	ARG	HIS	ARG	LEU	ASP	PHE	ASN	ALA	THR	LYS	LYS	LYS	THR							
ASP	GLU	ALA	PRO	SER	LYS	GLU	THR	GLY	VAL	LYS	ALA	THR	ALA	ASP	THR	SER	ALA	VAL	HIS	GLN	LEU	GLU	THR	ASN	ARG	LYS	PRO	GLN	ASN	PHE	PRO	LYS	VAL	VAL	ALA	THR	THR	LYS	SER	VAL	SER	ALA	ASP	TYR	SER	LYS	THR	ALA	VAL	HIS	ASN	ASP	THR	ILE	ILE	THR	THR	THR	THR	GLU	SER	THR	THR	ALA	SER	LYS	LYS	SER	THR	THR	THR	THR
ASN	VAL	THR	LEU	HIS	PHE	ASN	ALA	THR	GLN	THR	THR	THR	ALA	ALA	GLN	PRO	VAL	GLN	PRO	V655	G659	Y660	C661	E662	N663	C664	R665	I675	H680	F690	F691	A692	S695	L696	R701	PHE	GLN	ILE																																		

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	30807	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	48.4	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	81000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.086	Depositor
Minimum map value	-0.033	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.004	Depositor
Recommended contour level	0.014	Depositor
Map size ( $\text{\AA}$ )	385.92, 385.92, 385.92	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.072, 1.072, 1.072	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: ADP, MG, BEF, ZN

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
2	2	0.27	0/5046	0.51	0/6817
2	B	0.27	0/5046	0.52	0/6817
3	3	0.30	0/5073	0.51	0/6878
3	C	0.32	0/5053	0.51	0/6852
4	4	0.30	0/5401	0.51	0/7302
4	D	0.29	0/5401	0.49	0/7302
5	5	0.29	0/5000	0.49	0/6766
5	E	0.28	0/5000	0.50	0/6766
6	6	0.32	0/4968	0.54	0/6704
6	F	0.31	0/4968	0.54	0/6704
7	7	0.32	0/5451	0.52	0/7368
7	G	0.31	0/5451	0.49	0/7368
8	8	0.29	0/3373	0.51	0/4549
9	9	0.27	0/2872	0.49	0/3864
All	All	0.30	0/68103	0.51	0/92057

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	1	20	0	6	0	0
2	2	4960	0	5001	116	0
2	B	4960	0	5002	138	0
3	3	4986	0	5053	106	0
3	C	4966	0	5034	94	0
4	4	5323	0	5387	130	0
4	D	5323	0	5387	117	0
5	5	4927	0	4982	117	0
5	E	4927	0	4982	140	0
6	6	4889	0	4913	128	0
6	F	4889	0	4913	128	0
7	7	5370	0	5426	129	0
7	G	5370	0	5426	95	0
8	8	3292	0	3249	148	0
9	9	2813	0	2821	102	0
10	2	27	0	12	0	0
10	3	27	0	12	3	0
10	4	27	0	12	1	0
10	5	27	0	12	3	0
10	6	27	0	12	3	0
10	7	27	0	12	1	0
10	8	27	0	12	6	0
10	B	27	0	12	3	0
10	C	27	0	12	1	0
10	D	27	0	12	1	0
10	E	27	0	12	2	0
10	F	27	0	12	2	0
10	G	27	0	12	0	0
11	2	1	0	0	0	0
11	3	1	0	0	0	0
11	4	1	0	0	0	0
11	5	1	0	0	0	0
11	6	1	0	0	0	0
11	7	1	0	0	0	0
11	8	2	0	0	0	0
11	B	1	0	0	0	0
11	C	1	0	0	0	0
11	D	1	0	0	0	0
11	E	1	0	0	0	0
11	F	1	0	0	0	0
11	G	1	0	0	0	0
12	2	1	0	0	0	0
12	4	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
12	5	1	0	0	0	0
12	6	1	0	0	0	0
12	7	1	0	0	0	0
12	8	1	0	0	0	0
12	9	1	0	0	0	0
12	B	1	0	0	0	0
12	D	1	0	0	0	0
12	E	1	0	0	0	0
12	F	1	0	0	0	0
12	G	1	0	0	0	0
13	3	8	0	0	1	0
13	4	4	0	0	0	0
13	8	4	0	0	0	0
13	D	4	0	0	1	0
13	E	4	0	0	1	0
13	G	4	0	0	0	0
All	All	67420	0	67738	1511	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 11.

The worst 5 of 1511 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)
3:C:519:VAL:HG21	3:C:534:ALA:CB	1.72	1.16
3:C:519:VAL:HG21	3:C:534:ALA:HB2	1.34	1.09
4:4:609:VAL:CG1	7:7:506:MET:HG2	1.88	1.03
2:B:181:LEU:N	2:B:206:THR:HG1	1.56	1.01
3:C:519:VAL:CG2	3:C:534:ALA:HB3	1.95	0.94

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all 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	
2	2	618/868 (71%)	596 (96%)	22 (4%)	0	100	100
2	B	618/868 (71%)	594 (96%)	24 (4%)	0	100	100
3	3	621/971 (64%)	601 (97%)	20 (3%)	0	100	100
3	C	619/971 (64%)	595 (96%)	24 (4%)	0	100	100
4	4	664/933 (71%)	639 (96%)	25 (4%)	0	100	100
4	D	664/933 (71%)	645 (97%)	19 (3%)	0	100	100
5	5	618/775 (80%)	604 (98%)	14 (2%)	0	100	100
5	E	618/775 (80%)	598 (97%)	20 (3%)	0	100	100
6	6	607/1017 (60%)	589 (97%)	18 (3%)	0	100	100
6	F	607/1017 (60%)	588 (97%)	19 (3%)	0	100	100
7	7	675/845 (80%)	655 (97%)	20 (3%)	0	100	100
7	G	675/845 (80%)	652 (97%)	23 (3%)	0	100	100
8	8	394/507 (78%)	381 (97%)	13 (3%)	0	100	100
9	9	327/704 (46%)	312 (95%)	15 (5%)	0	100	100
All	All	8325/12029 (69%)	8049 (97%)	276 (3%)	0	100	100

There are no Ramachandran outliers to report.

### 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 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	
2	2	551/770 (72%)	551 (100%)	0	100	100
2	B	551/770 (72%)	550 (100%)	1 (0%)	93	97
3	3	550/835 (66%)	549 (100%)	1 (0%)	93	97
3	C	548/835 (66%)	548 (100%)	0	100	100
4	4	607/848 (72%)	604 (100%)	3 (0%)	88	94

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	D	607/848 (72%)	607 (100%)	0	100	100
5	5	564/688 (82%)	562 (100%)	2 (0%)	91	95
5	E	564/688 (82%)	563 (100%)	1 (0%)	93	97
6	6	541/886 (61%)	532 (98%)	9 (2%)	60	78
6	F	541/886 (61%)	534 (99%)	7 (1%)	69	82
7	7	603/753 (80%)	595 (99%)	8 (1%)	69	82
7	G	603/753 (80%)	603 (100%)	0	100	100
8	8	356/454 (78%)	353 (99%)	3 (1%)	81	89
9	9	313/639 (49%)	309 (99%)	4 (1%)	69	82
All	All	7499/10653 (70%)	7460 (100%)	39 (0%)	89	94

5 of 39 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
9	9	125	ARG
6	F	656	MET
9	9	200	LYS
6	F	501	GLN
6	F	762	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 16 such sidechains are listed below:

Mol	Chain	Res	Type
4	D	676	ASN
2	B	856	GLN
8	8	168	ASN
2	B	376	ASN
8	8	89	ASN

### 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 46 ligands modelled in this entry, 26 are monoatomic - leaving 20 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
10	ADP	E	802	11	24,29,29	0.71	0	29,45,45	0.81	1 (3%)
10	ADP	7	1102	11,13	24,29,29	0.72	0	29,45,45	0.73	1 (3%)
10	ADP	F	1101	11	24,29,29	3.60	14 (58%)	29,45,45	2.51	6 (20%)
13	BEF	E	801	10	0,3,3	-	-	-	-	-
10	ADP	C	1001	11,13	24,29,29	0.75	0	29,45,45	0.73	1 (3%)
10	ADP	G	1102	11,13	24,29,29	0.72	0	29,45,45	0.73	1 (3%)
13	BEF	8	1003	10	0,3,3	-	-	-	-	-
10	ADP	D	1102	11,13	24,29,29	0.72	0	29,45,45	0.79	1 (3%)
10	ADP	5	801	11	24,29,29	0.72	0	29,45,45	0.71	1 (3%)
13	BEF	3	1002	10	0,3,3	-	-	-	-	-
10	ADP	3	1001	11,13	24,29,29	0.75	0	29,45,45	0.73	1 (3%)
10	ADP	6	1101	11	24,29,29	3.61	15 (62%)	29,45,45	2.52	6 (20%)
10	ADP	8	1001	11,13	24,29,29	0.70	0	29,45,45	0.73	1 (3%)
13	BEF	G	1103	10	0,3,3	-	-	-	-	-
10	ADP	B	901	11	24,29,29	0.73	0	29,45,45	0.73	1 (3%)
10	ADP	2	901	11	24,29,29	0.68	0	29,45,45	0.78	1 (3%)
13	BEF	D	1103	10	0,3,3	-	-	-	-	-
10	ADP	4	1102	11,13	24,29,29	0.72	0	29,45,45	0.79	1 (3%)
13	BEF	3	1004	10	0,3,3	-	-	-	-	-
13	BEF	4	1103	10	0,3,3	-	-	-	-	-

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
10	ADP	D	1102	11,13	-	2/12/32/32	0/3/3/3
10	ADP	B	901	11	-	6/12/32/32	0/3/3/3
10	ADP	2	901	11	-	4/12/32/32	0/3/3/3
10	ADP	3	1001	11,13	-	4/12/32/32	0/3/3/3
10	ADP	5	801	11	-	4/12/32/32	0/3/3/3
10	ADP	E	802	11	-	3/12/32/32	0/3/3/3
10	ADP	7	1102	11,13	-	8/12/32/32	0/3/3/3
10	ADP	F	1101	11	-	4/12/32/32	0/3/3/3
10	ADP	4	1102	11,13	-	2/12/32/32	0/3/3/3
10	ADP	6	1101	11	-	4/12/32/32	0/3/3/3
10	ADP	8	1001	11,13	-	1/12/32/32	0/3/3/3
10	ADP	C	1001	11,13	-	4/12/32/32	0/3/3/3
10	ADP	G	1102	11,13	-	8/12/32/32	0/3/3/3

The worst 5 of 29 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	6	1101	ADP	C2'-C3'	-9.93	1.26	1.53
10	F	1101	ADP	C2'-C3'	-9.91	1.26	1.53
10	F	1101	ADP	C2'-C1'	8.41	1.66	1.53
10	6	1101	ADP	C2'-C1'	8.40	1.66	1.53
10	6	1101	ADP	O4'-C1'	-5.51	1.33	1.41

The worst 5 of 23 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
10	6	1101	ADP	C5-C6-N6	8.32	132.99	120.35
10	F	1101	ADP	C5-C6-N6	8.30	132.97	120.35
10	F	1101	ADP	N6-C6-N1	-5.68	106.78	118.57
10	6	1101	ADP	N6-C6-N1	-5.68	106.79	118.57
10	6	1101	ADP	N3-C2-N1	-5.54	120.02	128.68

There are no chirality outliers.

5 of 54 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
10	2	901	ADP	PA-O3A-PB-O2B
10	2	901	ADP	PA-O3A-PB-O3B

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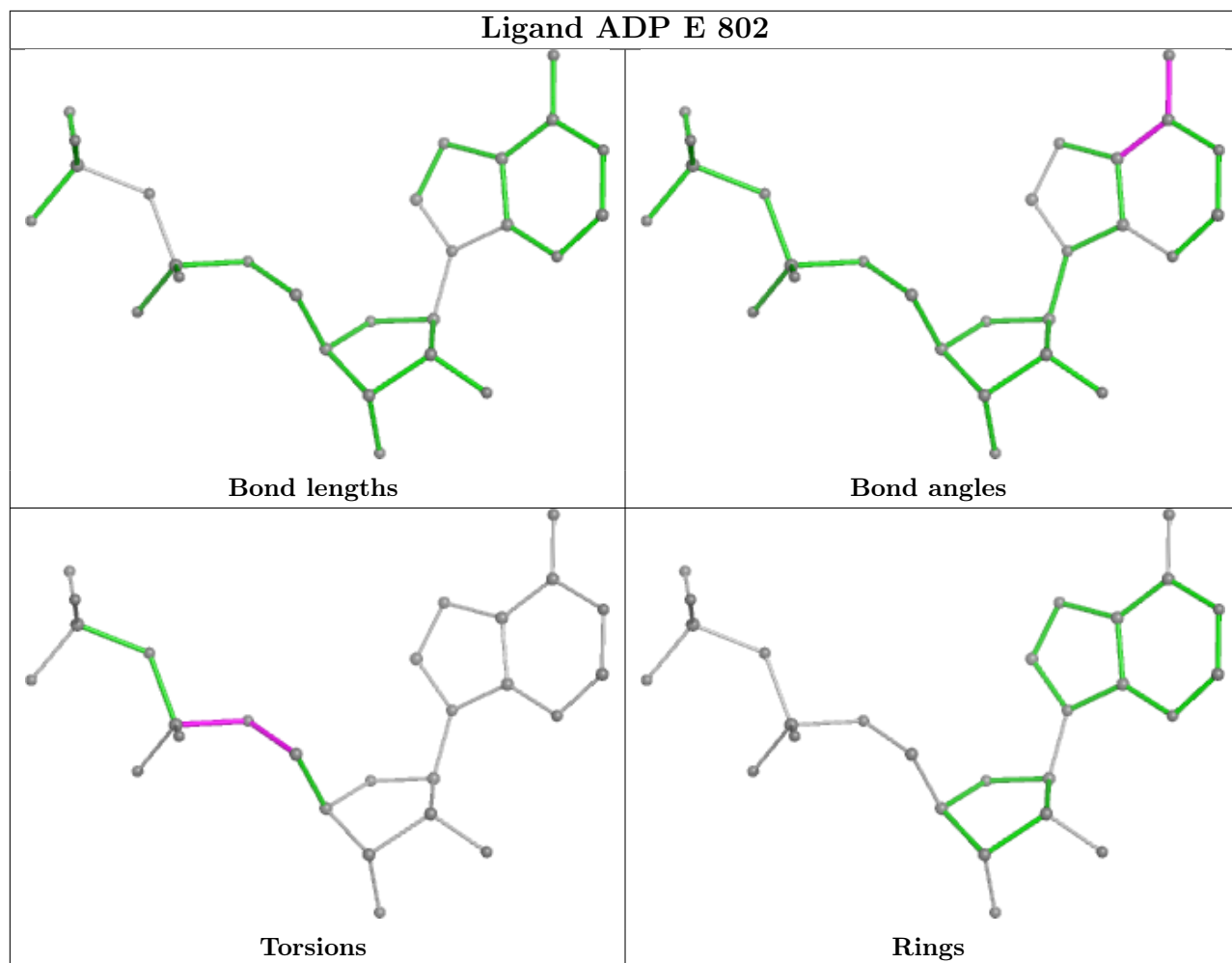
Mol	Chain	Res	Type	Atoms
10	2	901	ADP	C5'-O5'-PA-O2A
10	2	901	ADP	C5'-O5'-PA-O3A
10	3	1001	ADP	PA-O3A-PB-O2B

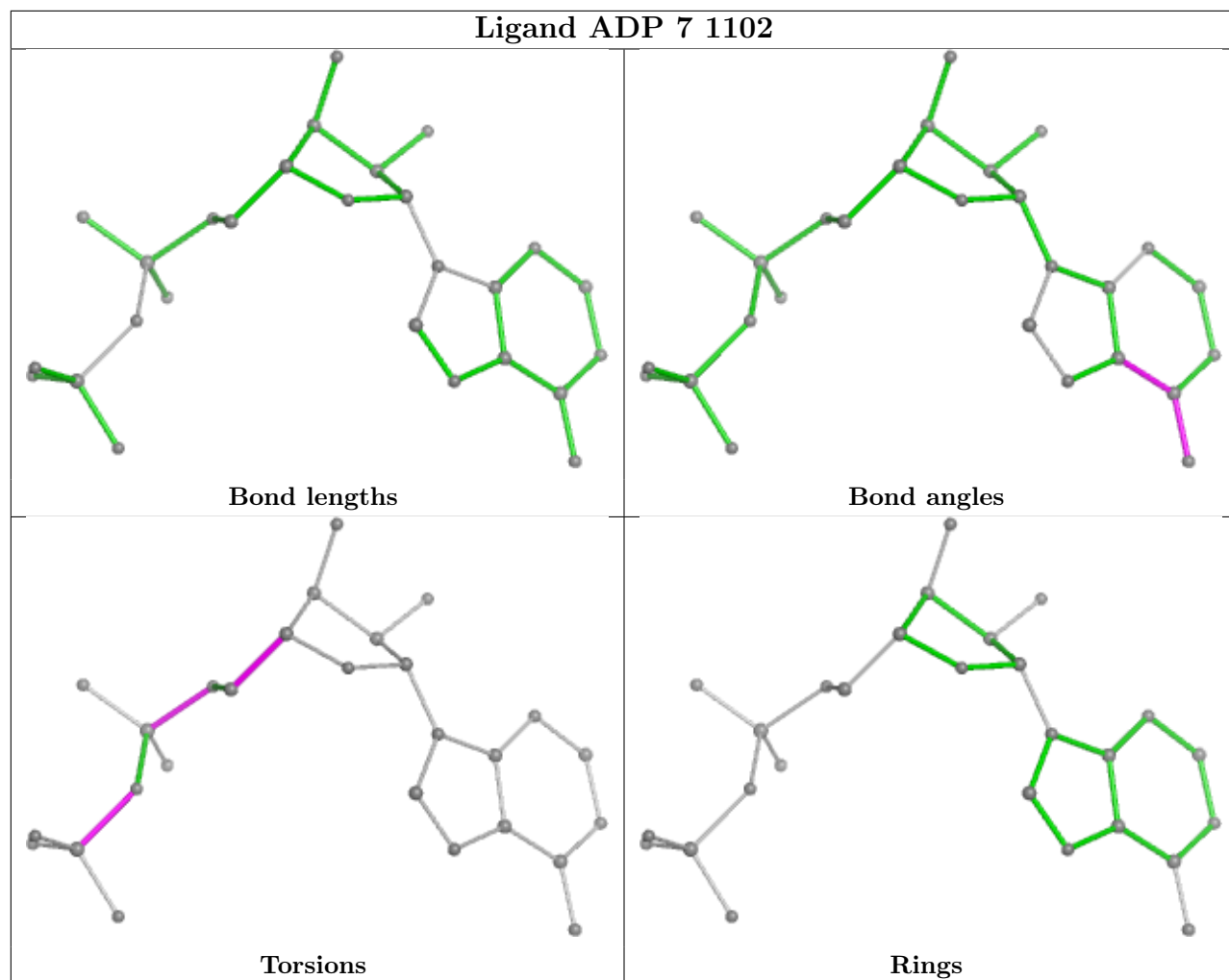
There are no ring outliers.

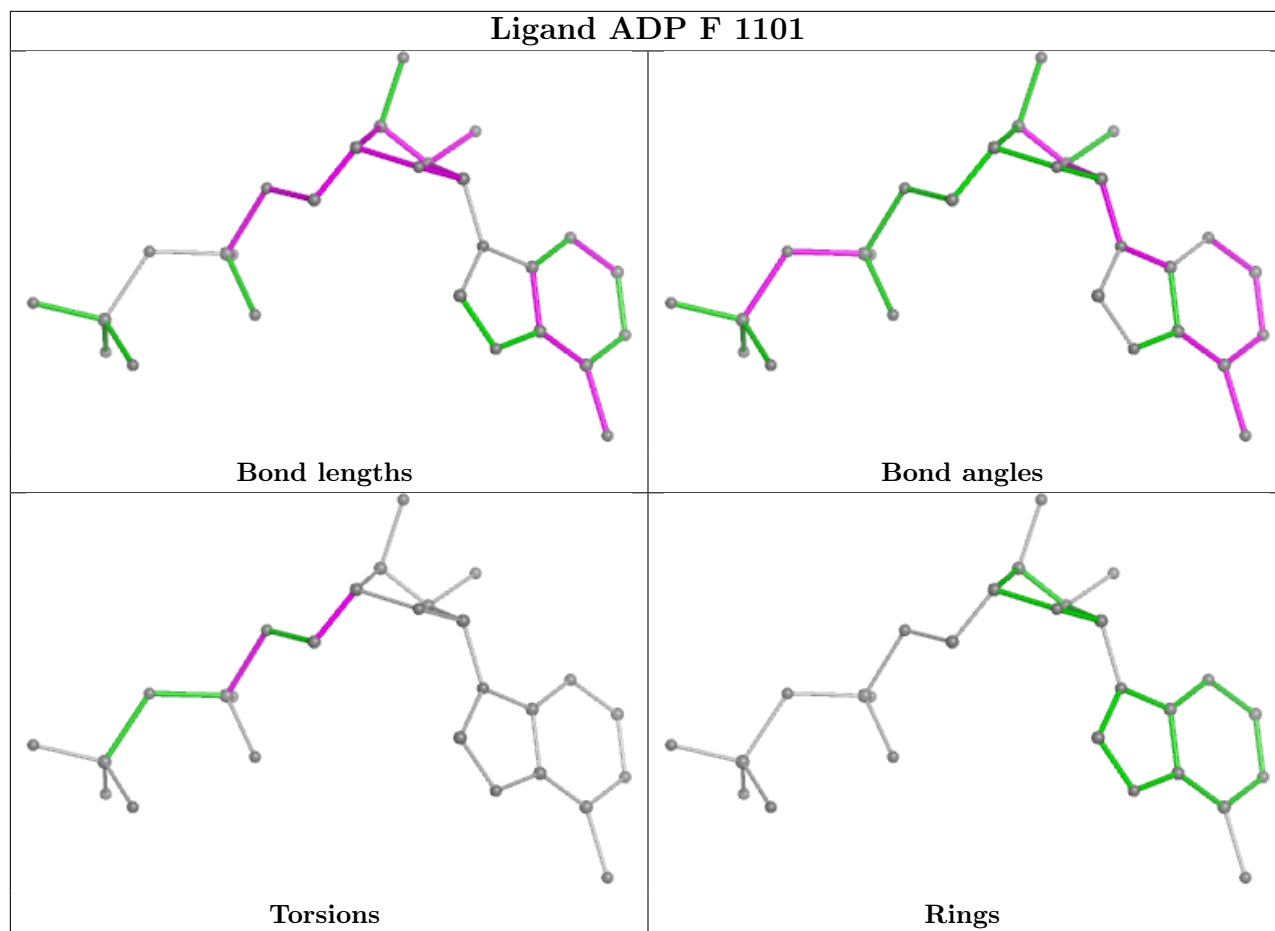
14 monomers are involved in 29 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
10	E	802	ADP	2	0
10	7	1102	ADP	1	0
10	F	1101	ADP	2	0
13	E	801	BEF	1	0
10	C	1001	ADP	1	0
10	D	1102	ADP	1	0
10	5	801	ADP	3	0
13	3	1002	BEF	1	0
10	3	1001	ADP	3	0
10	6	1101	ADP	3	0
10	8	1001	ADP	6	0
10	B	901	ADP	3	0
13	D	1103	BEF	1	0
10	4	1102	ADP	1	0

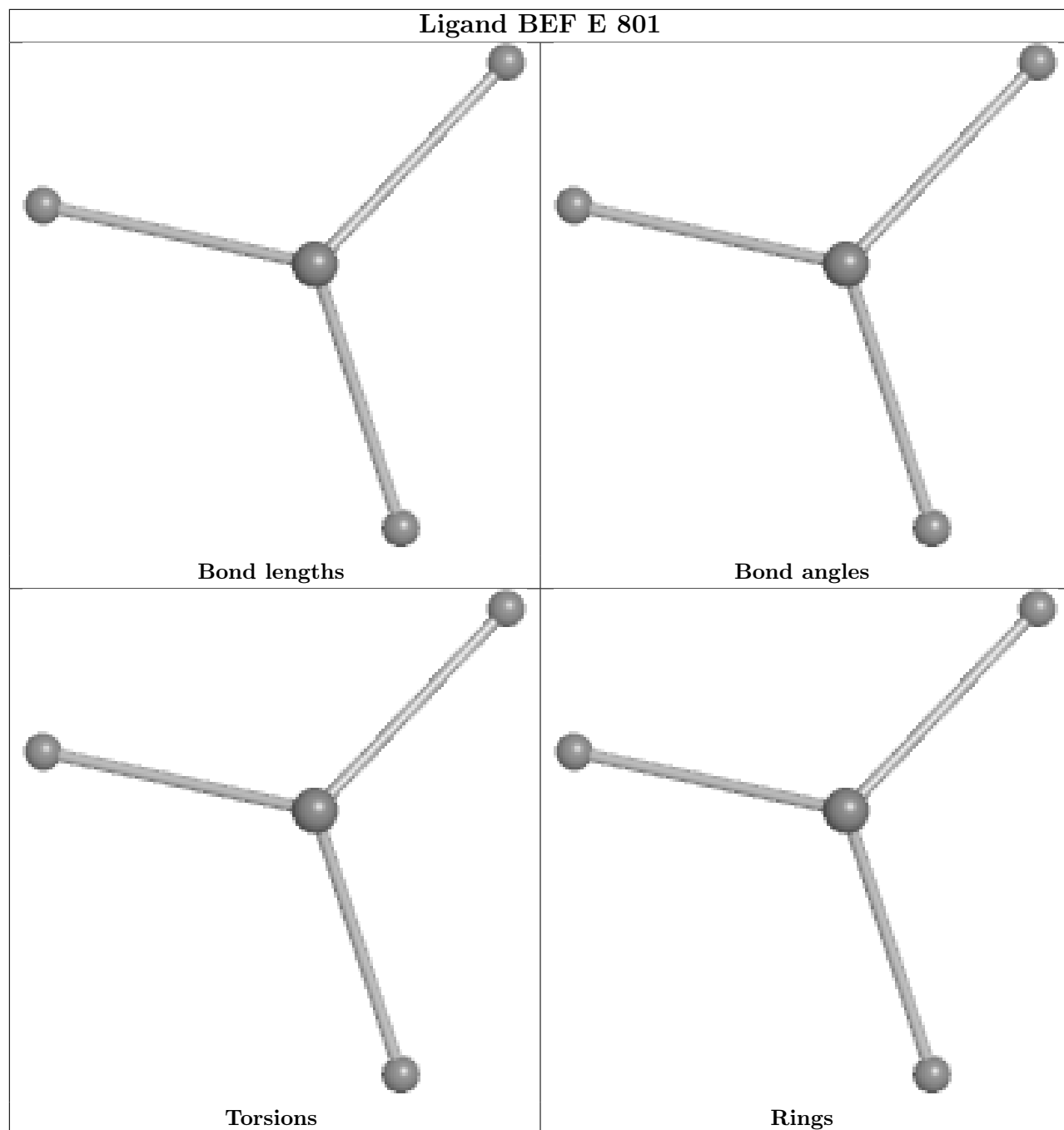
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.

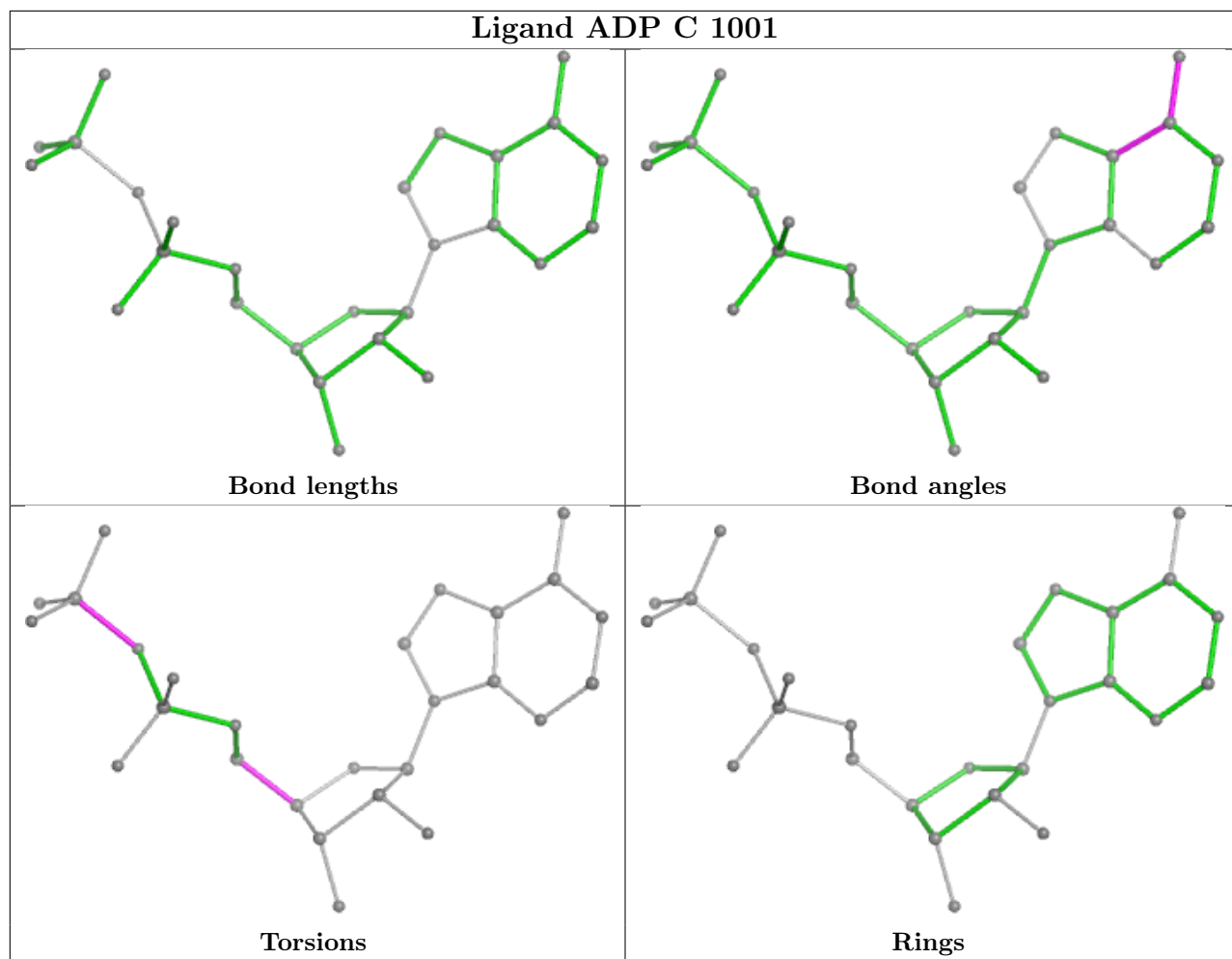


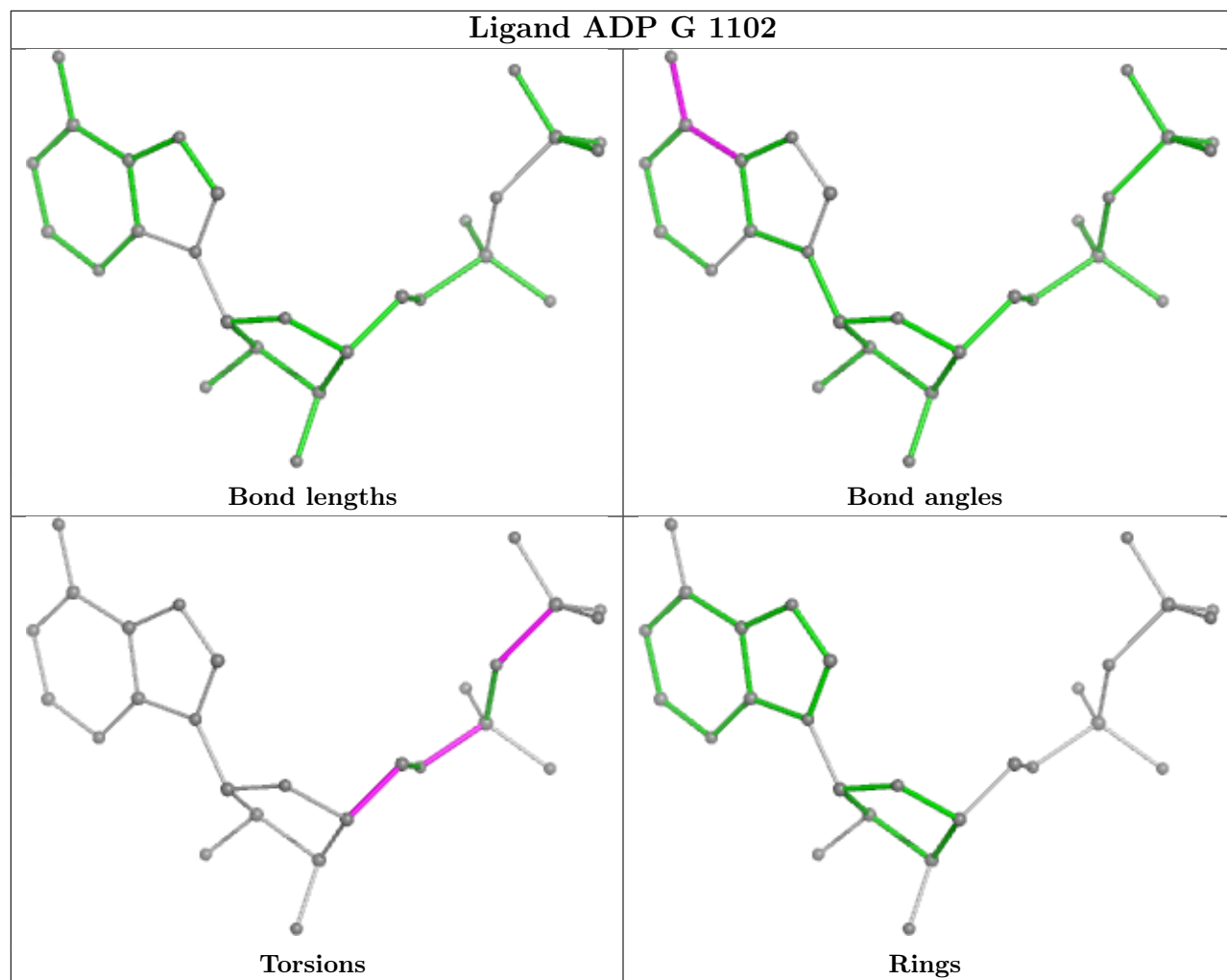


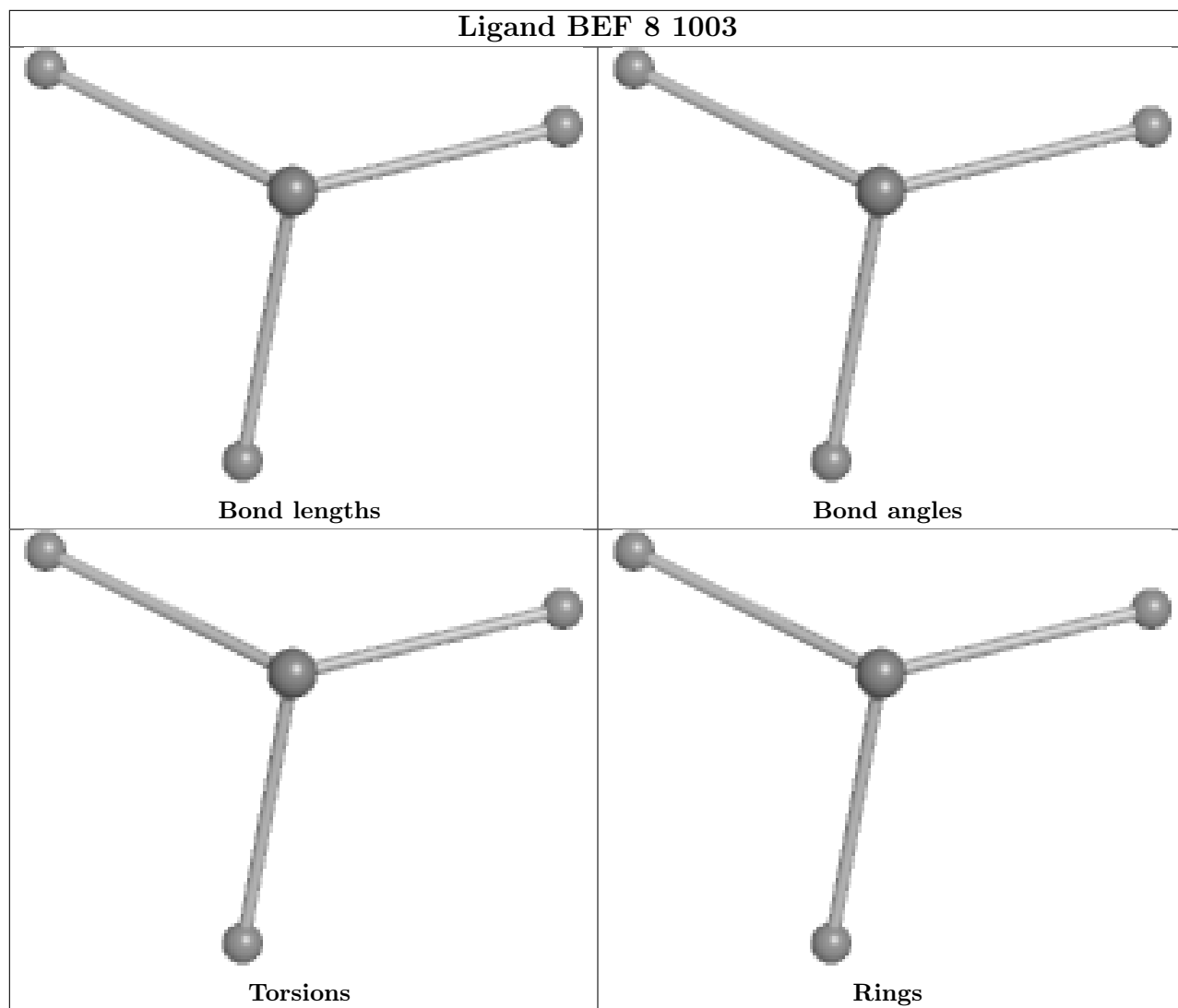


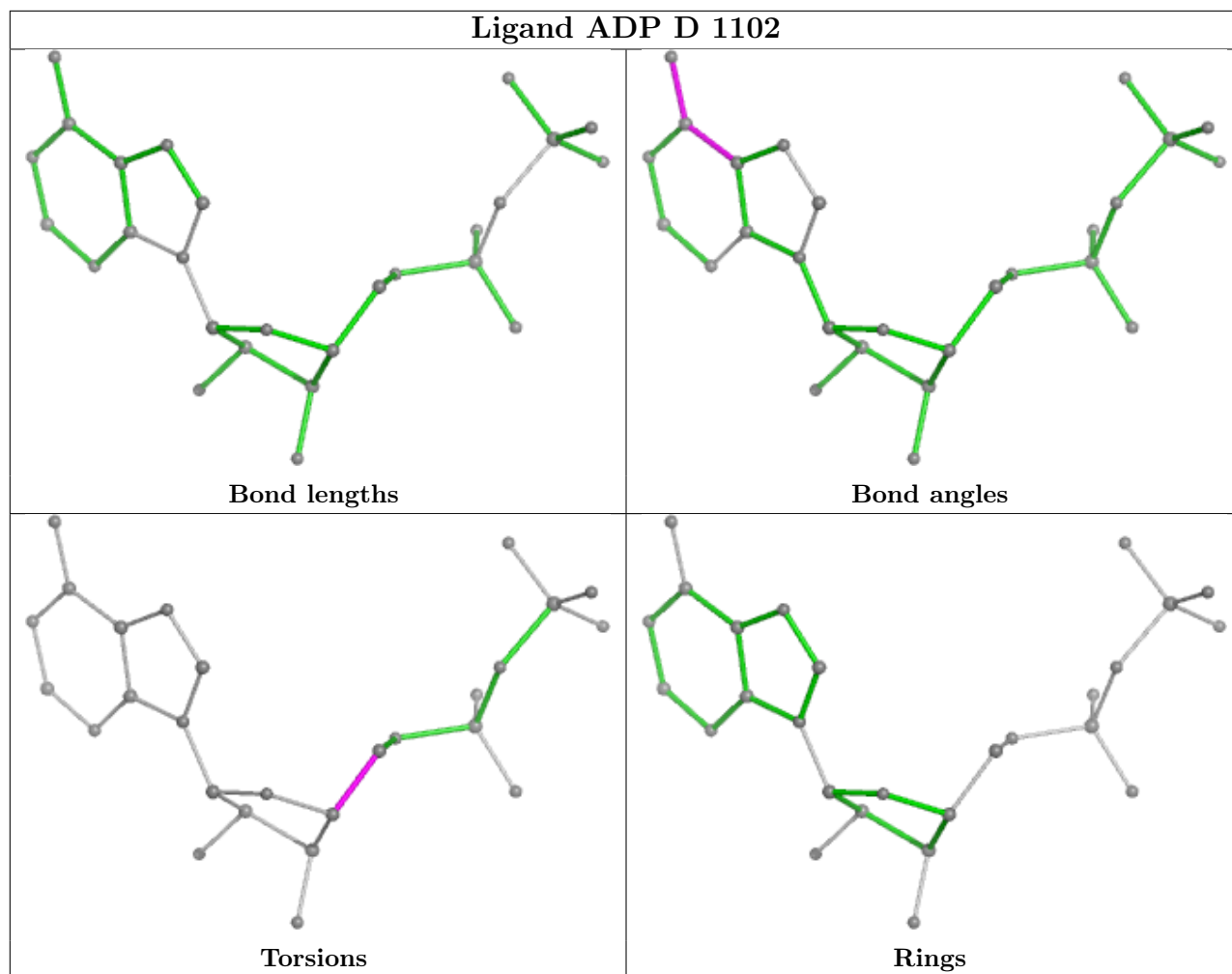


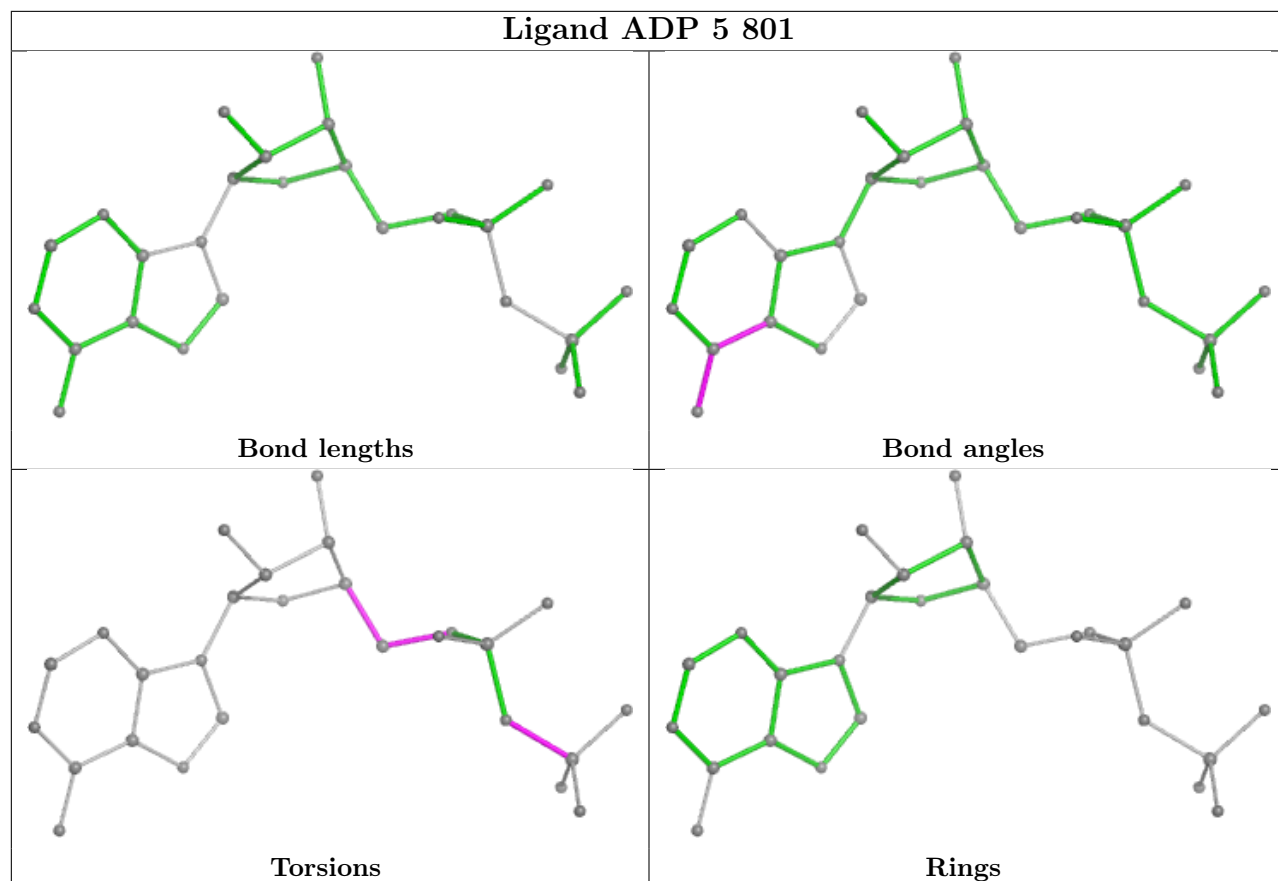


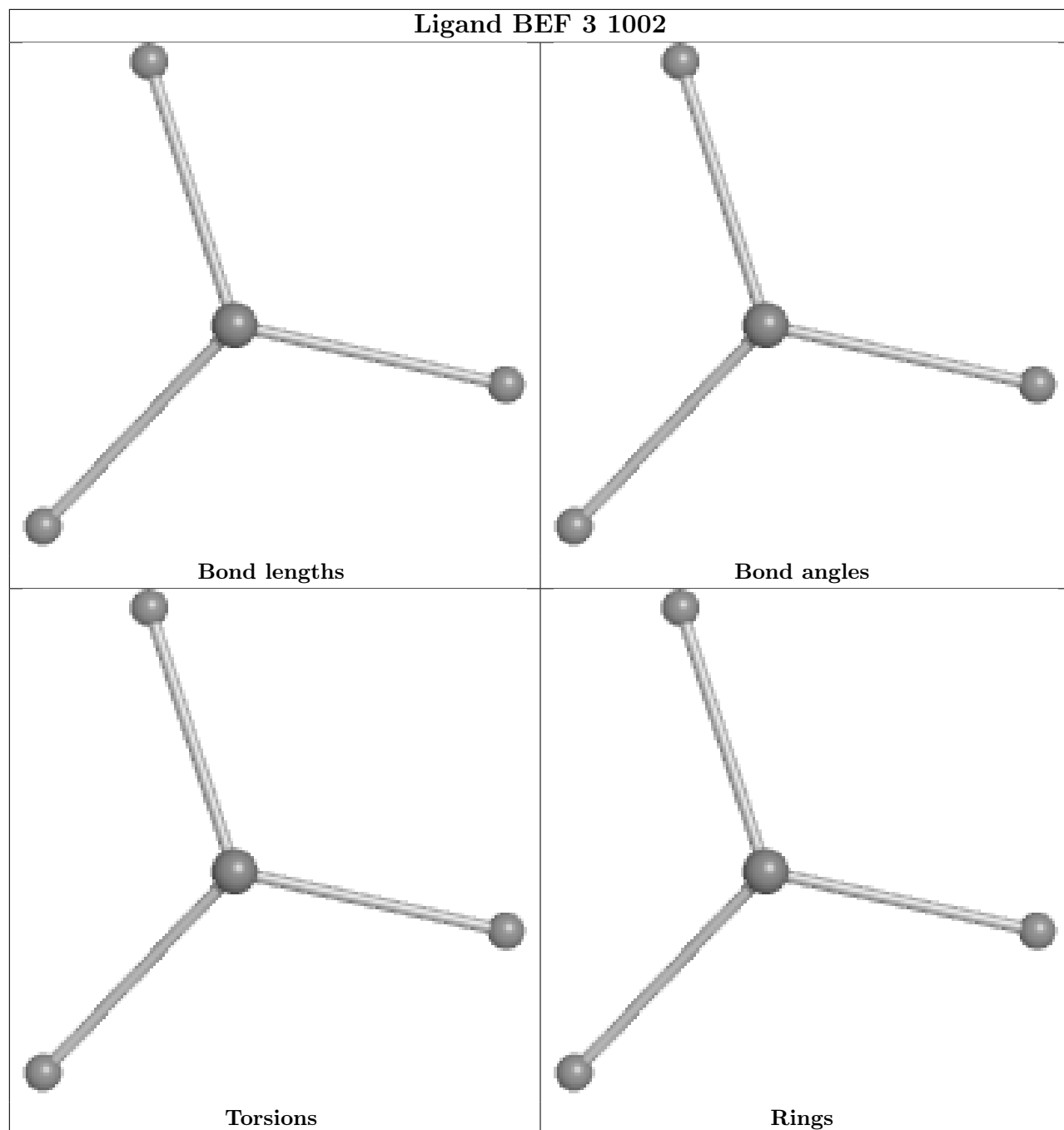


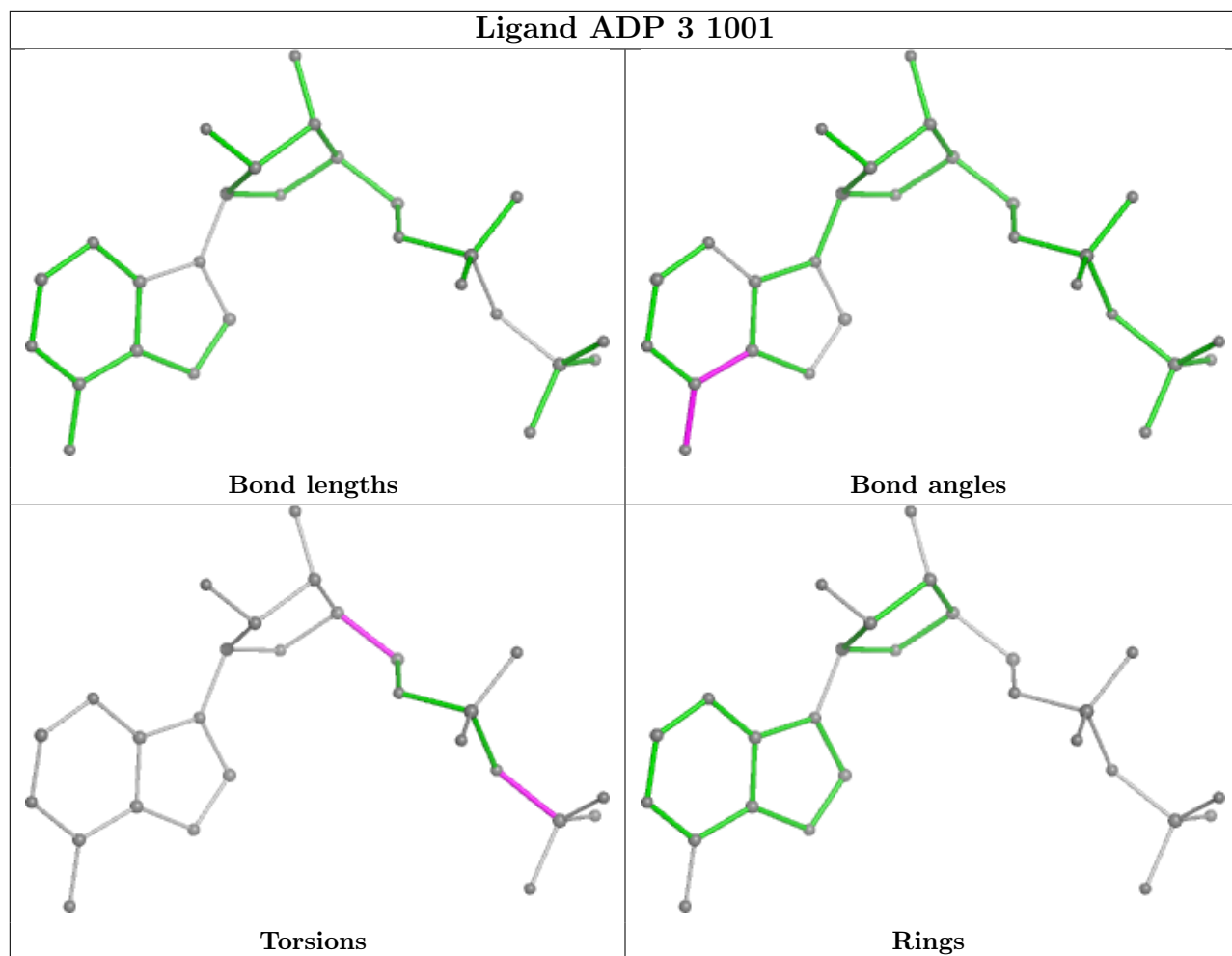




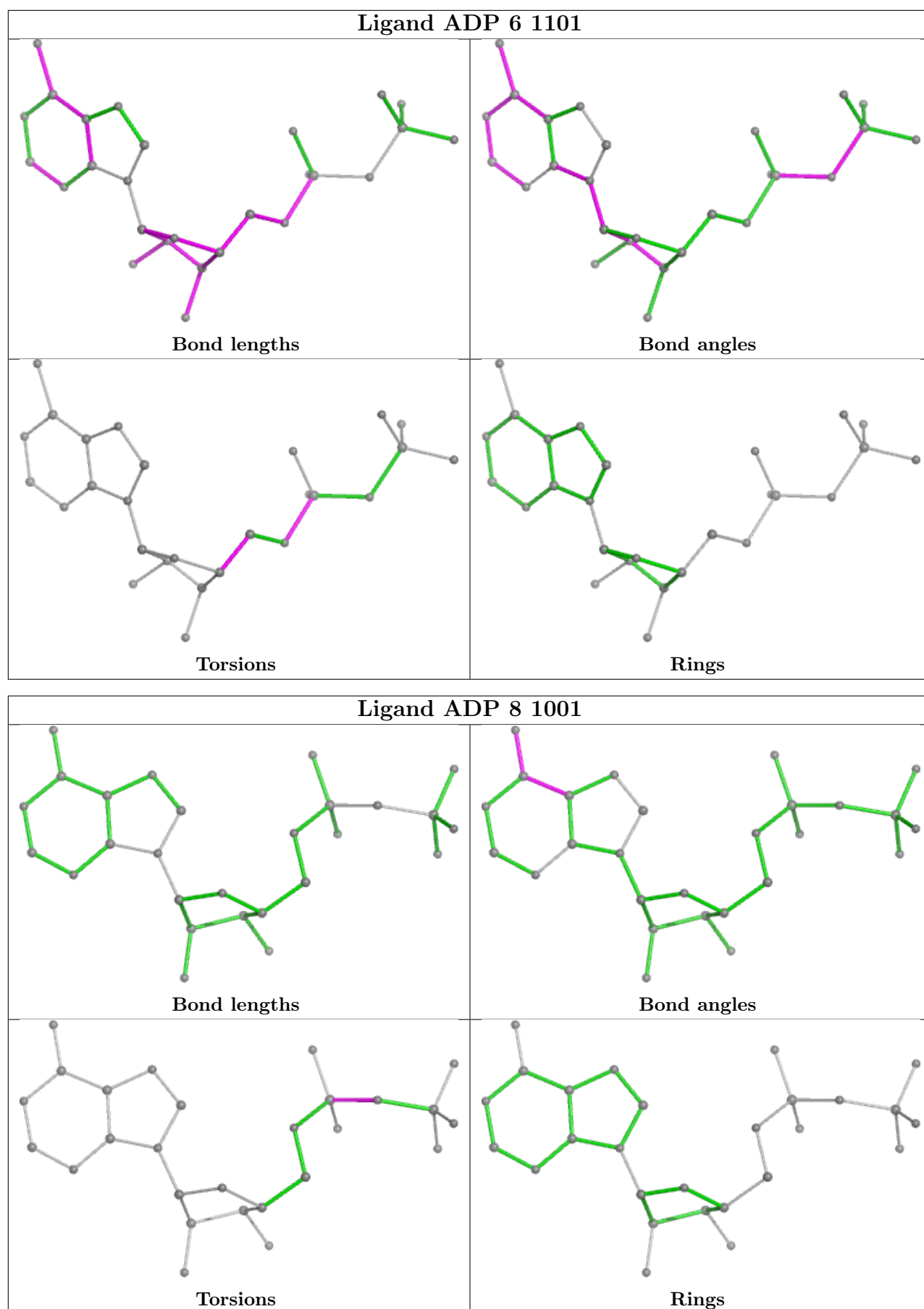


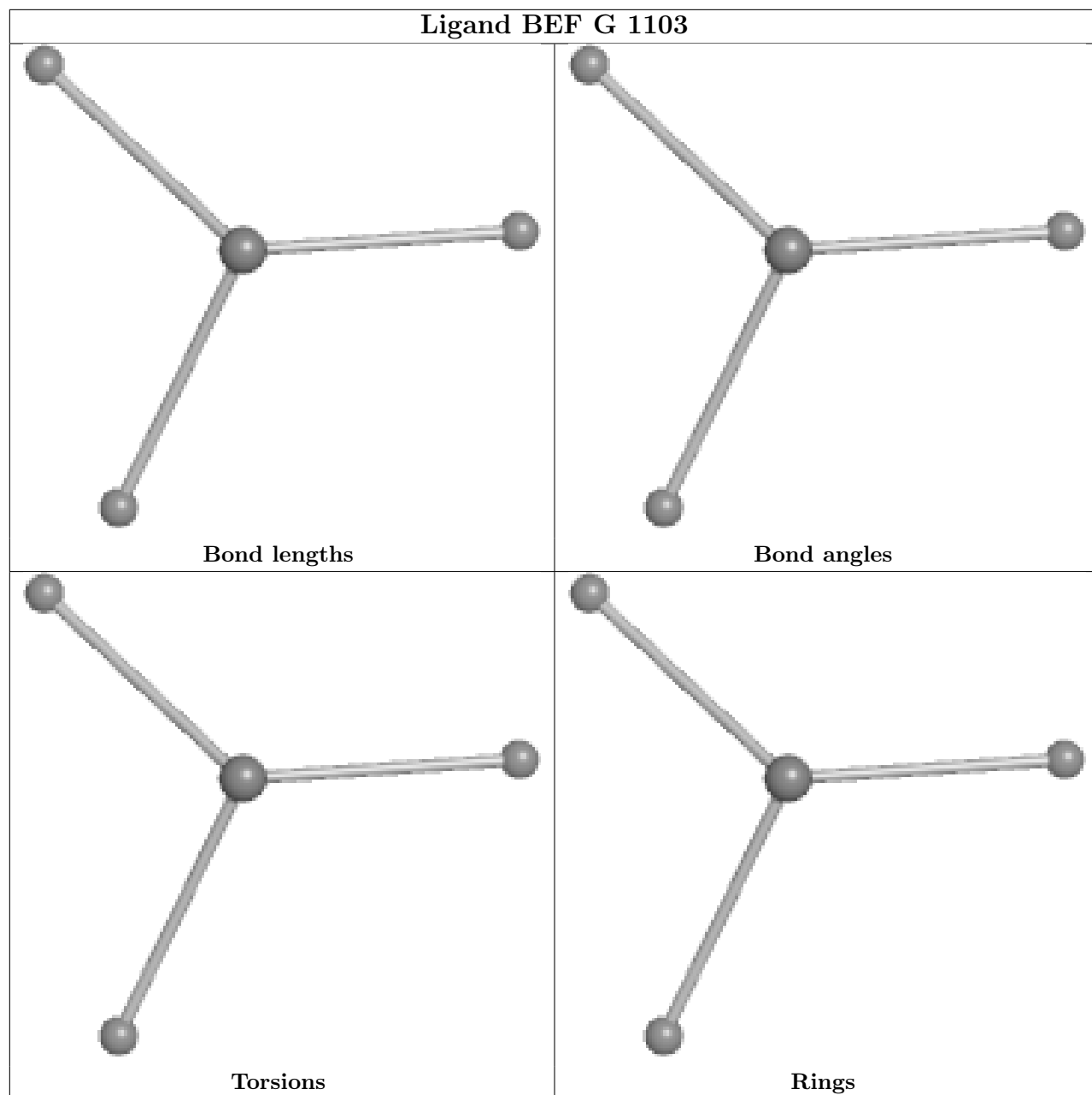


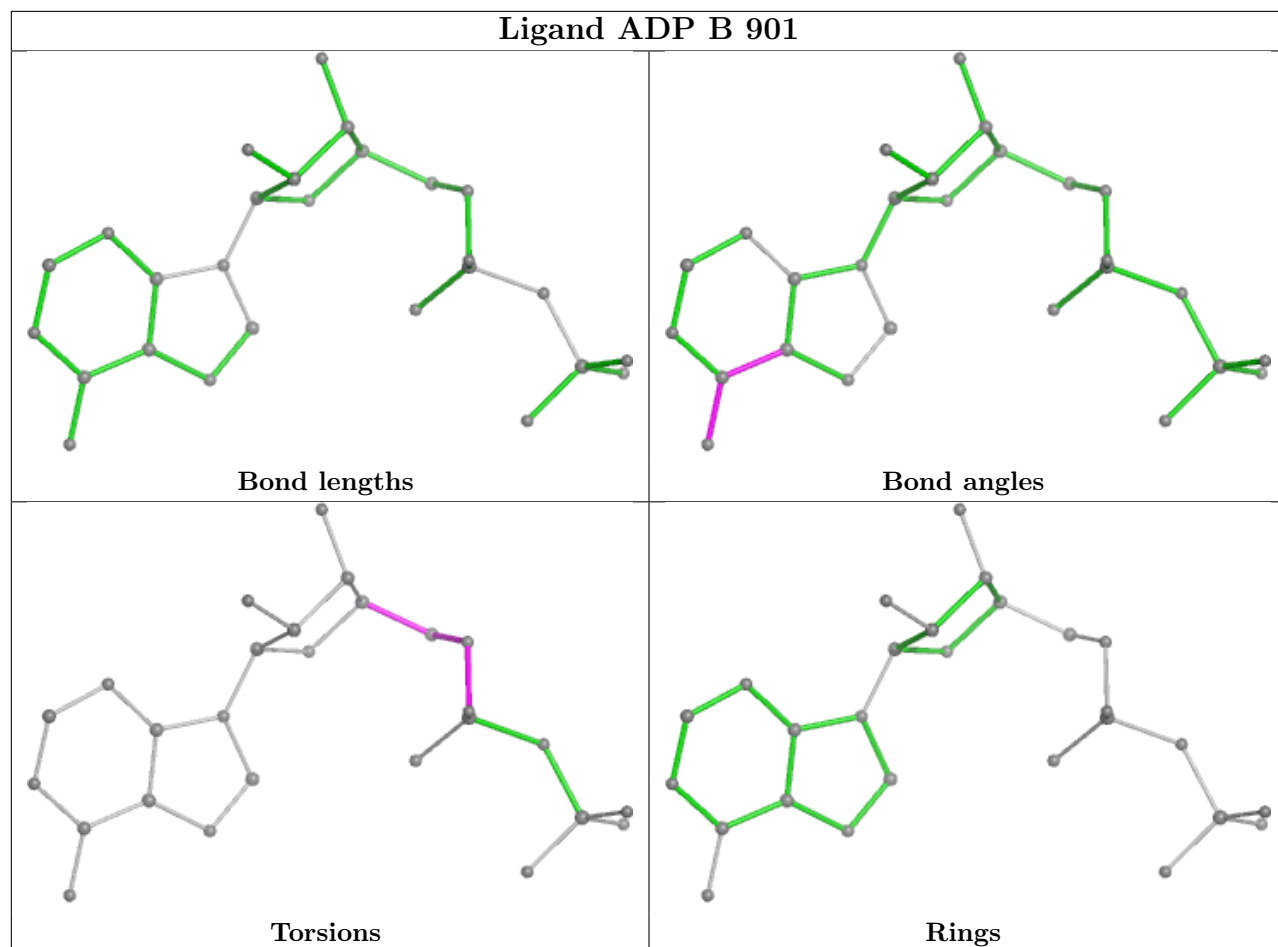


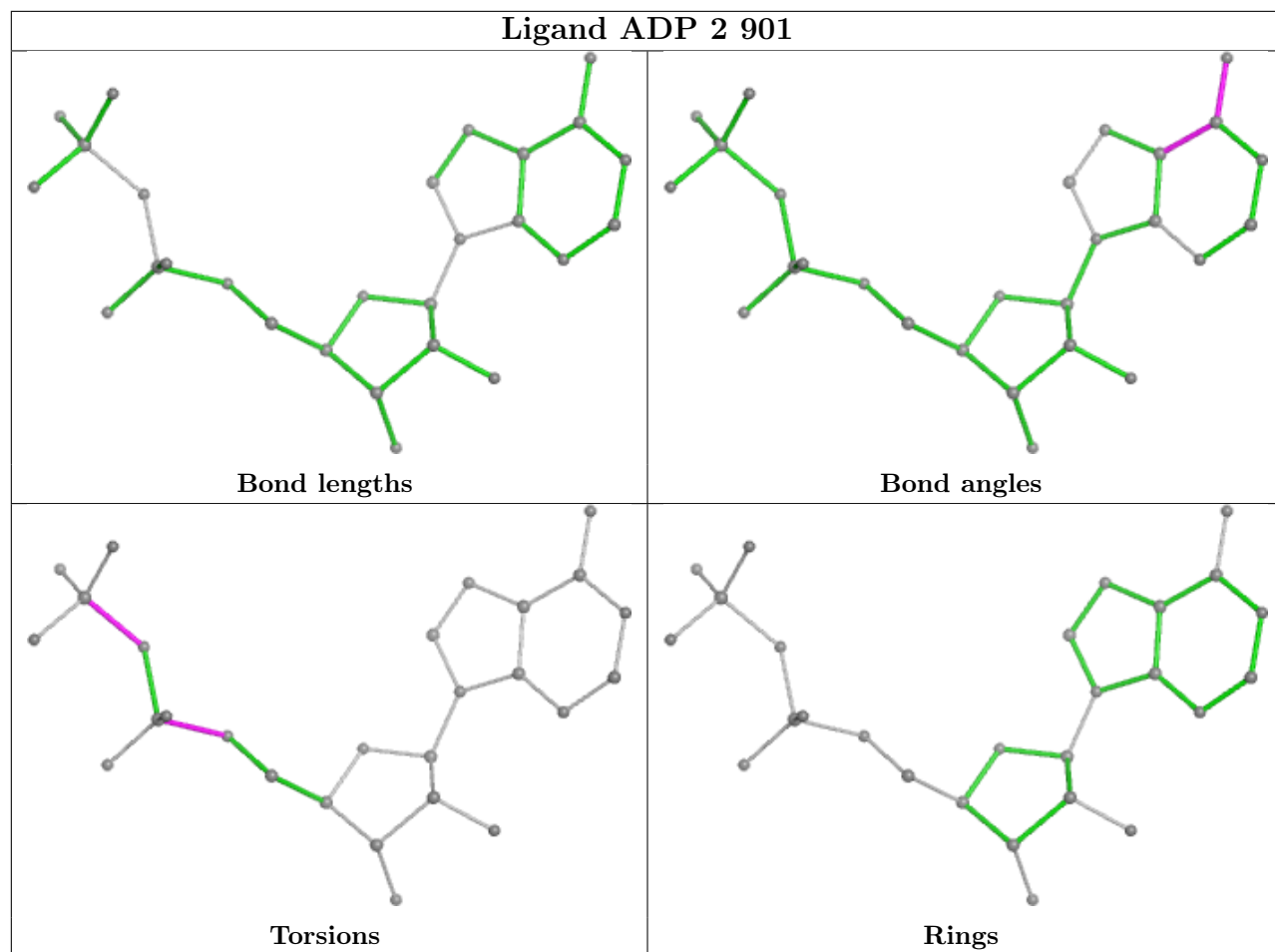


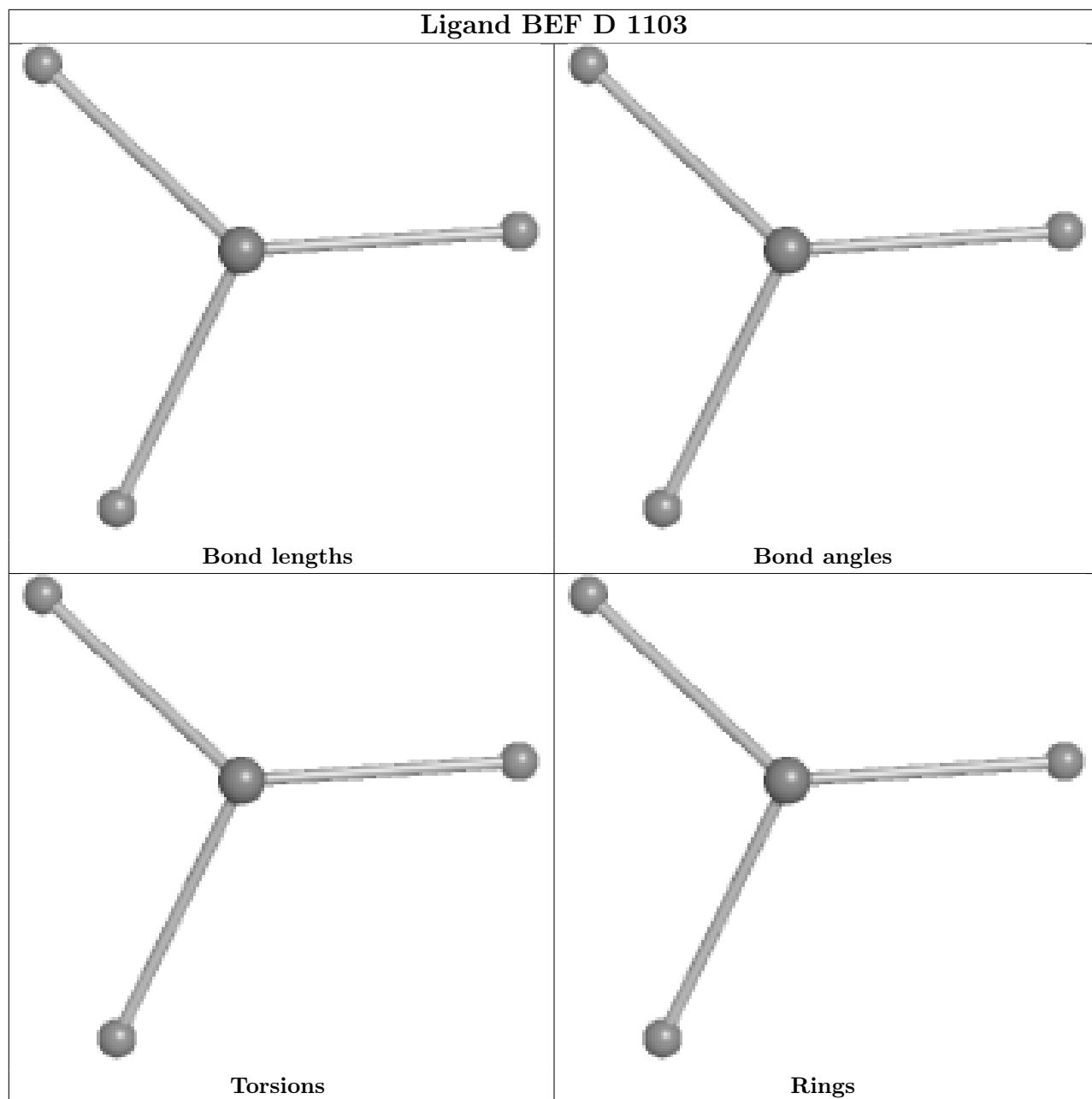


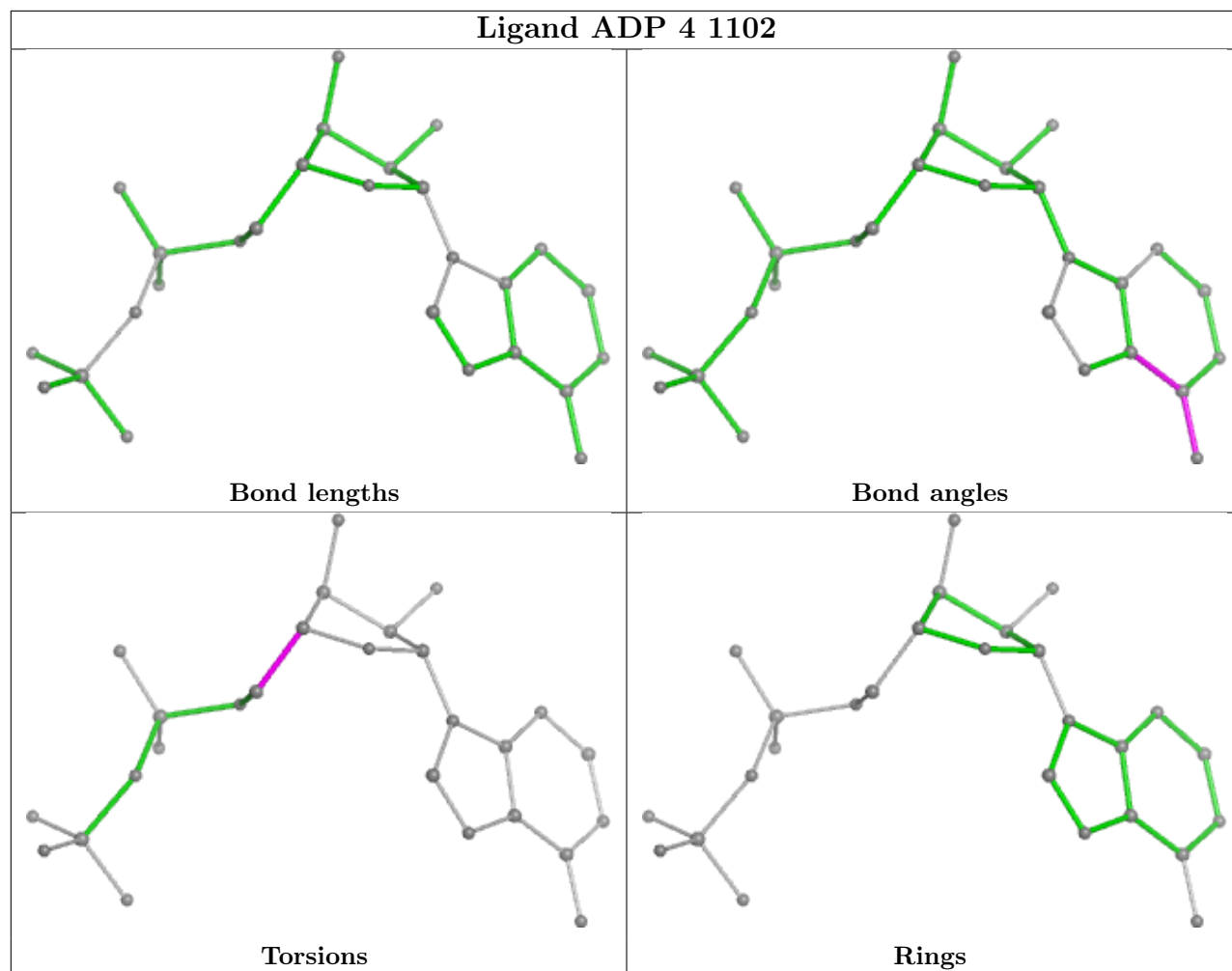


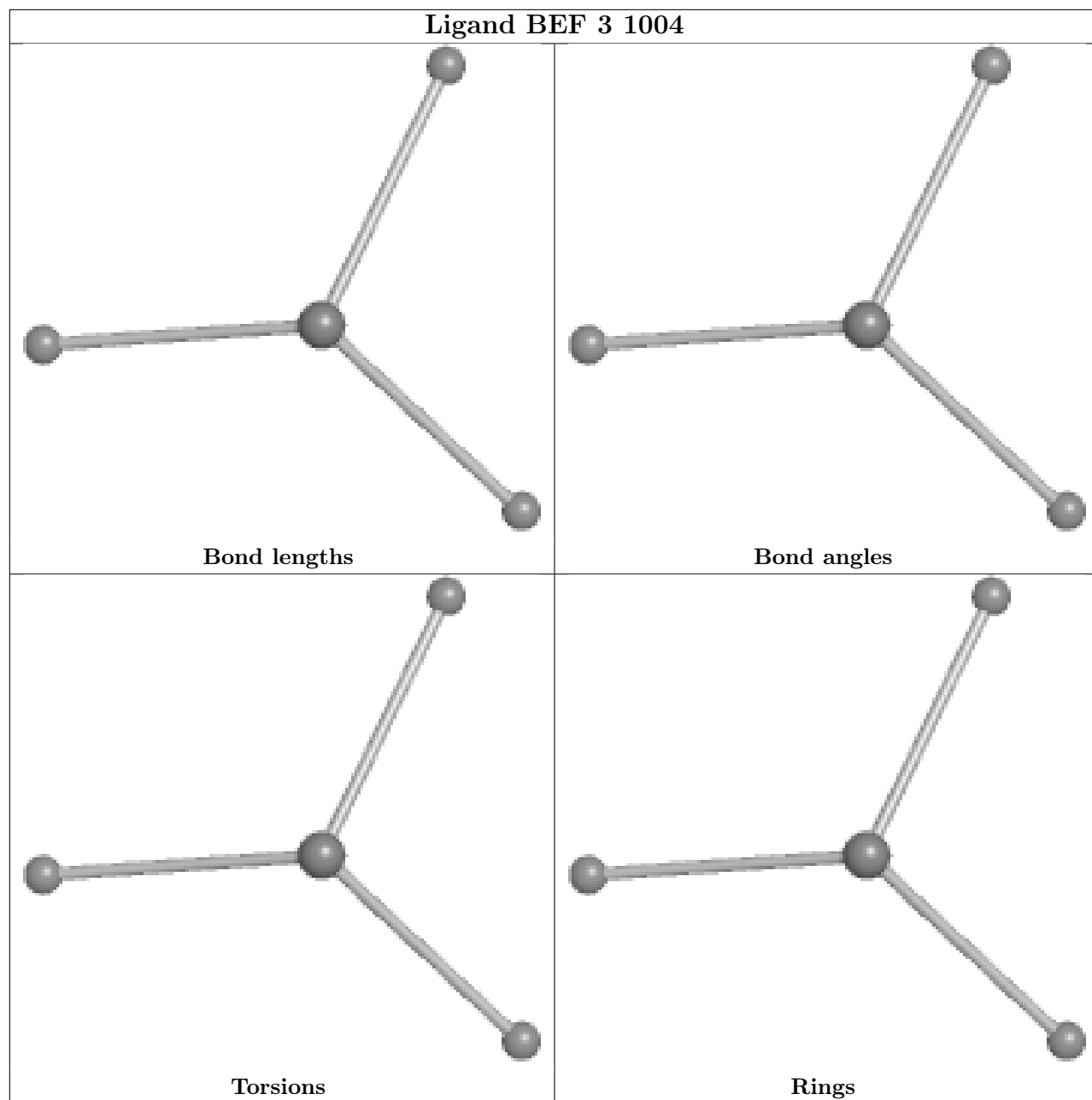


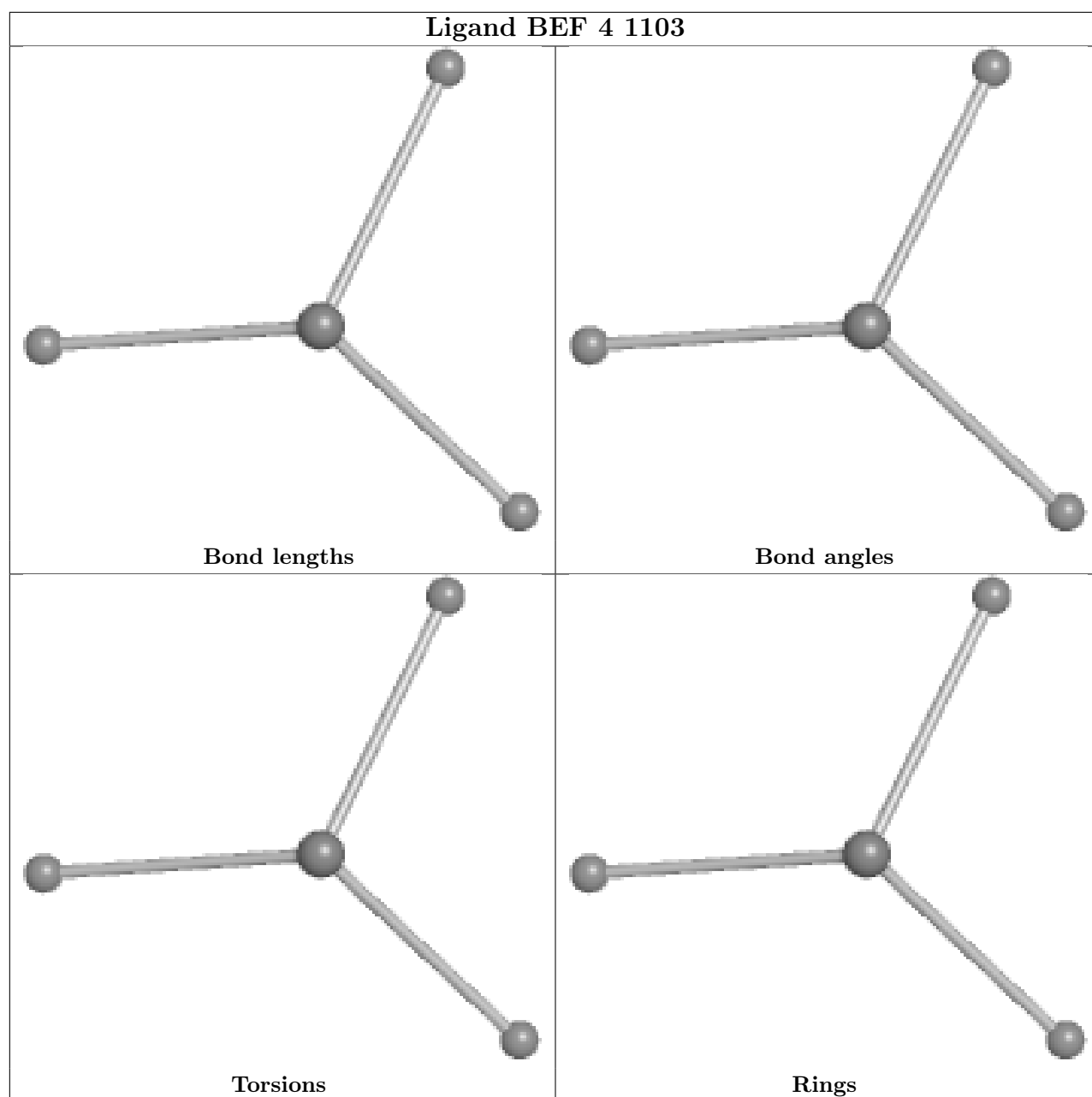












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.



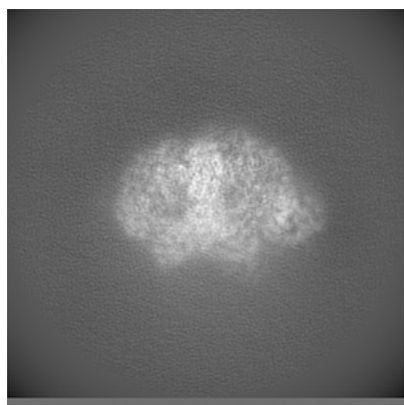
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-13620. These allow visual inspection of the internal detail of the map and identification of artifacts.

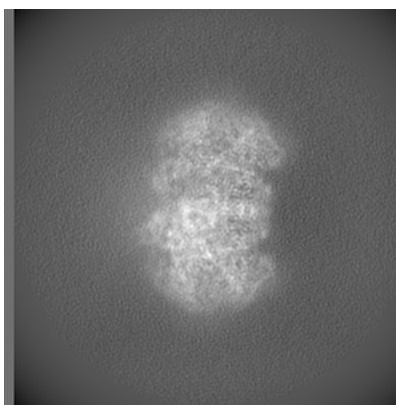
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

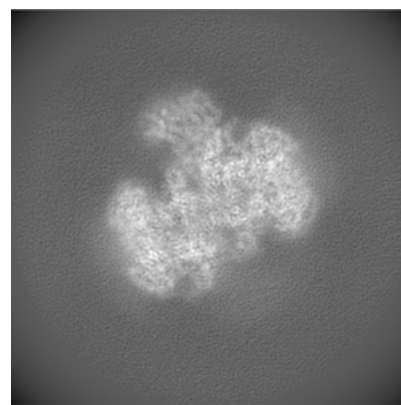
#### 6.1.1 Primary map



X



Y

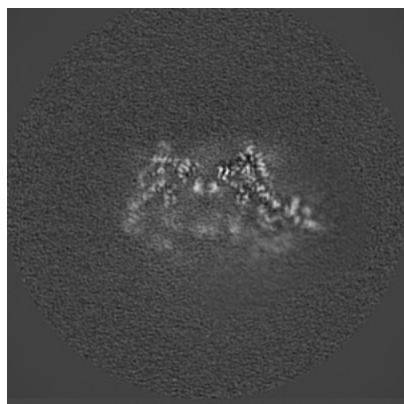


Z

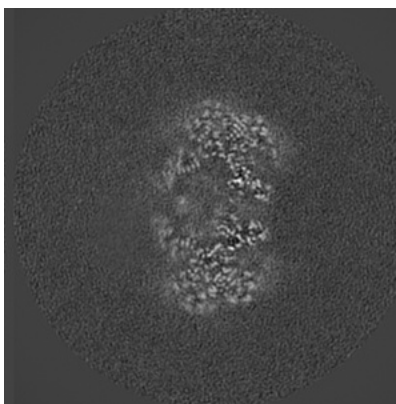
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

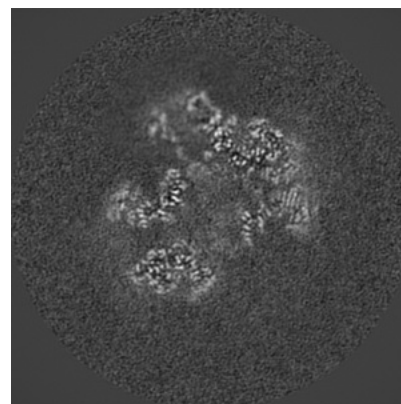
#### 6.2.1 Primary map



X Index: 180



Y Index: 180

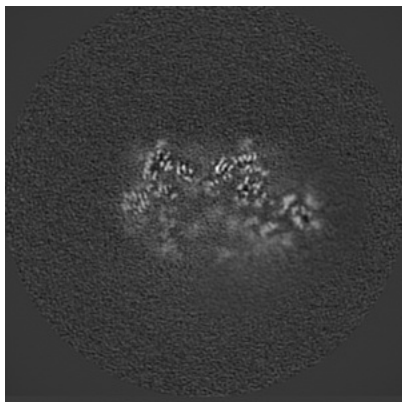


Z Index: 180

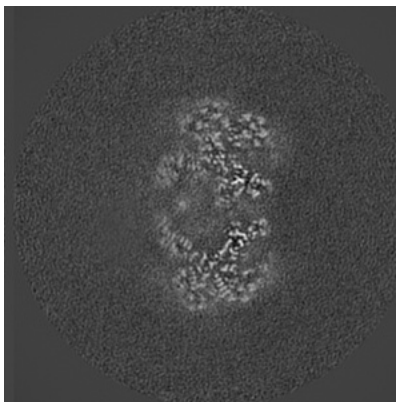
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

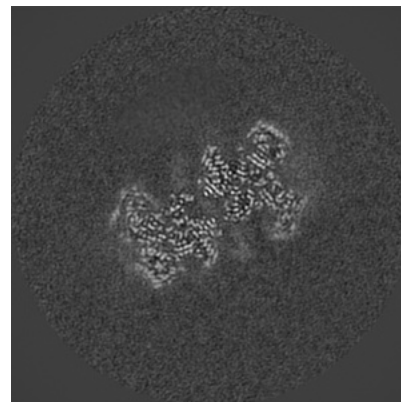
### 6.3.1 Primary map



X Index: 175



Y Index: 176

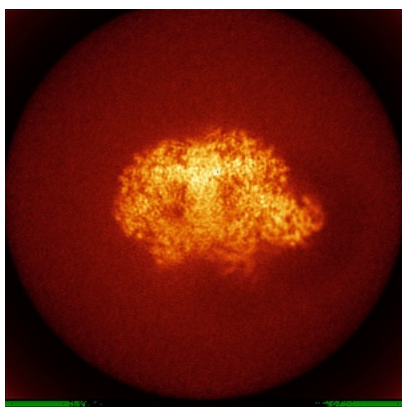


Z Index: 214

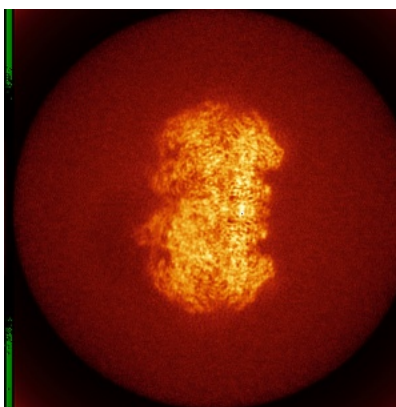
The images above show the largest variance slices of the map in three orthogonal directions.

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

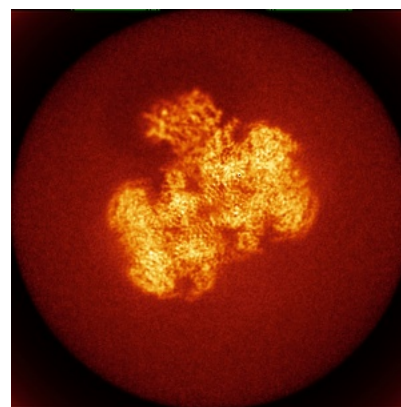
### 6.4.1 Primary map



X



Y

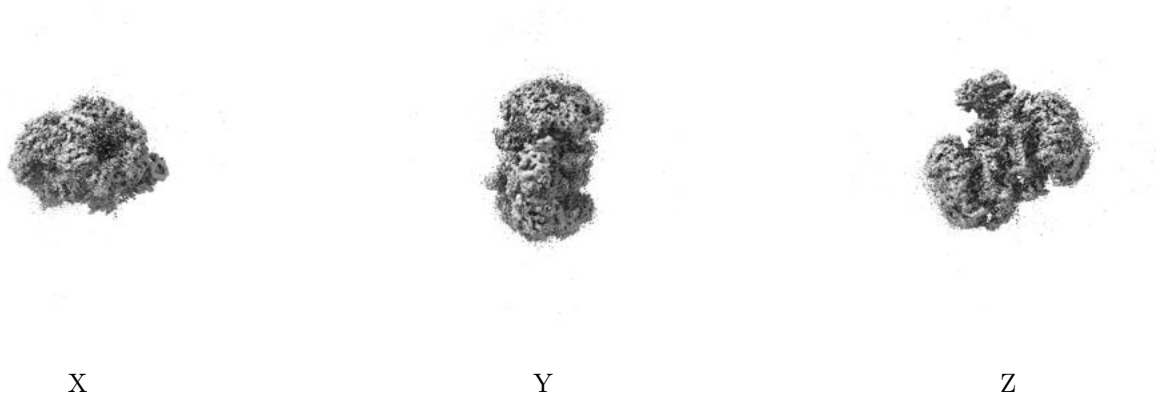


Z

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 0.014. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

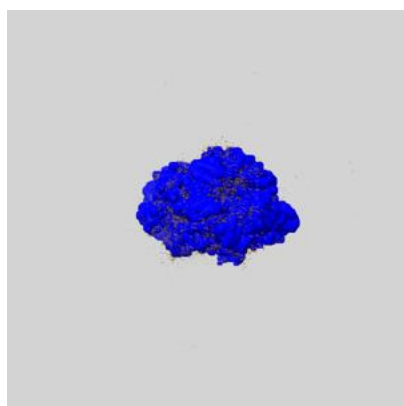
## 6.6 Mask visualisation [i](#)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

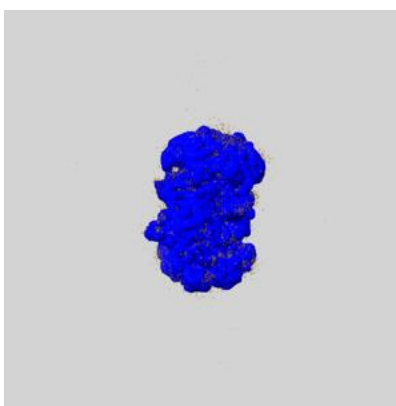
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

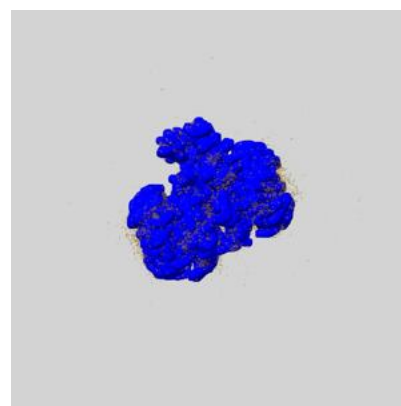
### 6.6.1 emd\_13620\_msk\_1.map [i](#)



X



Y

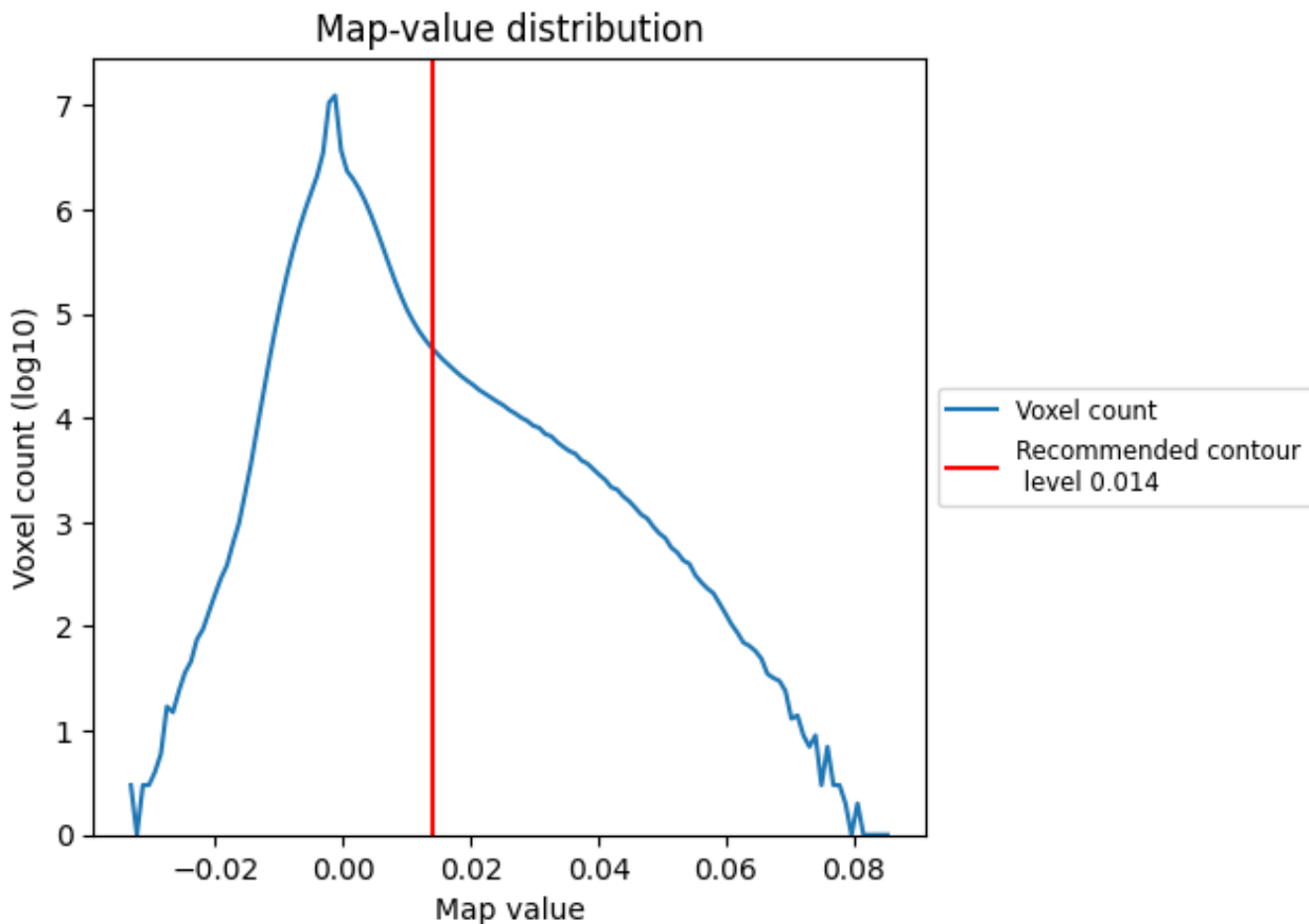


Z

## 7 Map analysis [i](#)

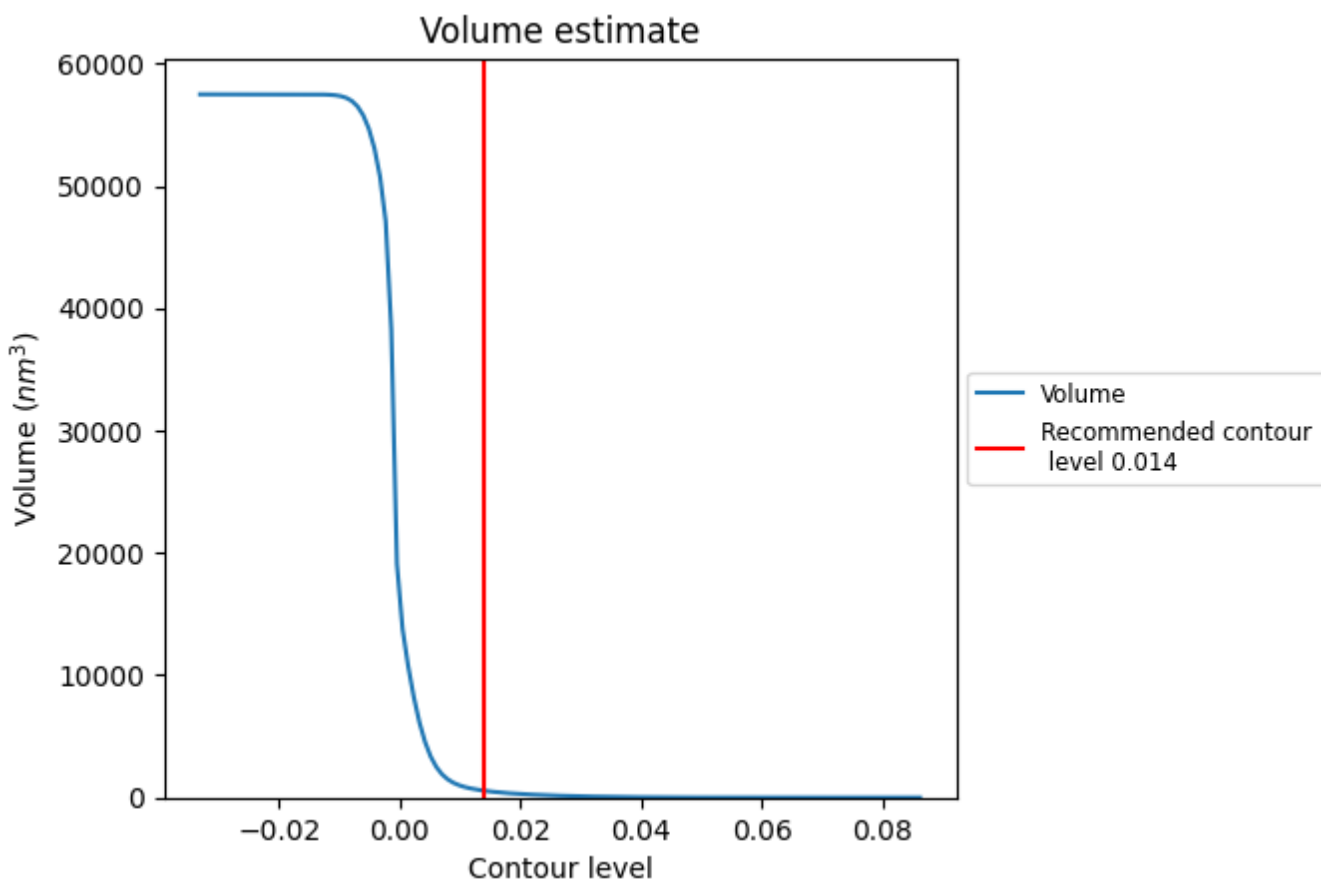
This section contains the results of statistical analysis of the map.

### 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.

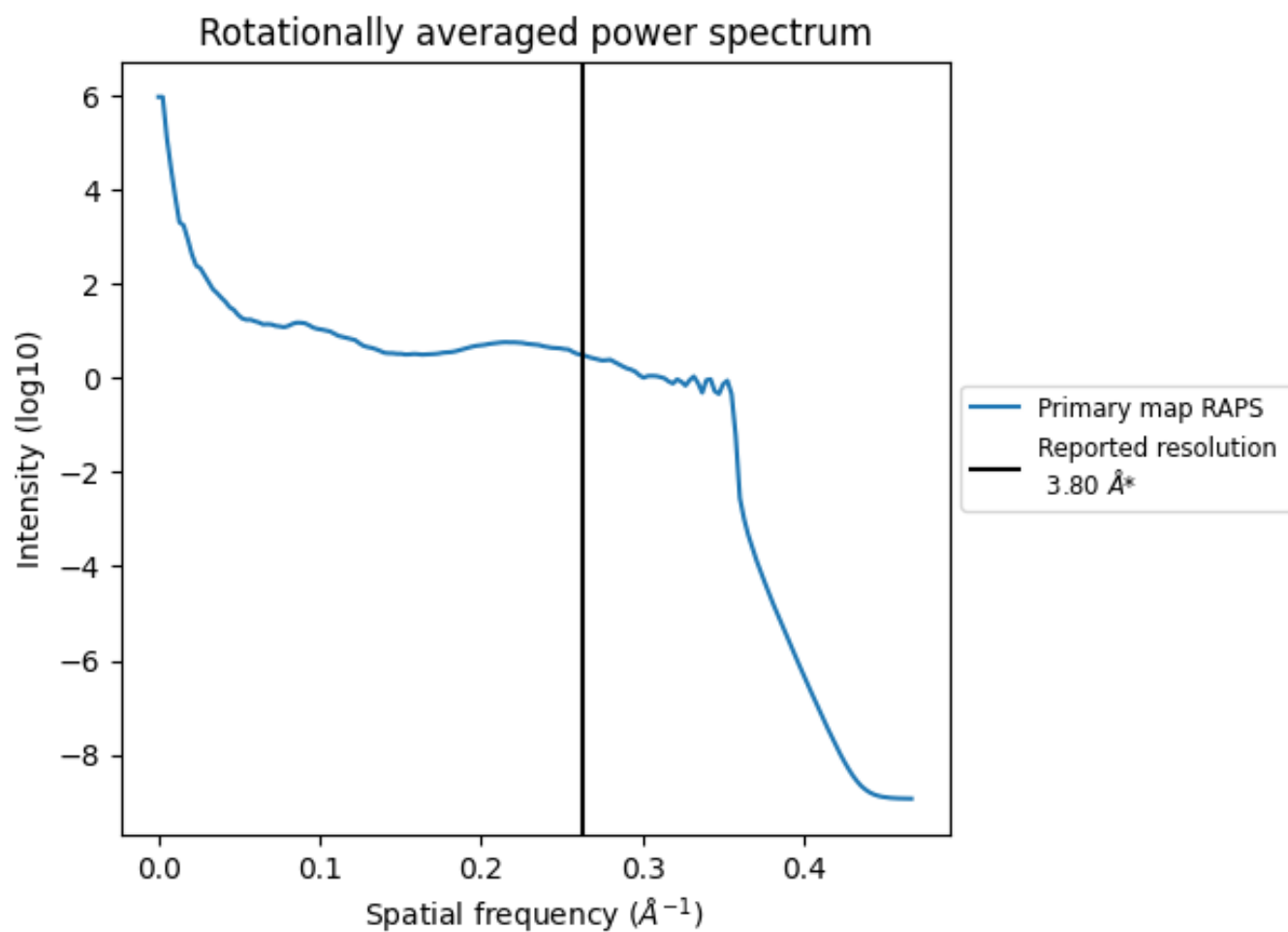
## 7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 557 nm<sup>3</sup>; this corresponds to an approximate mass of 504 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 0.263 Å<sup>-1</sup>

## 8 Fourier-Shell correlation

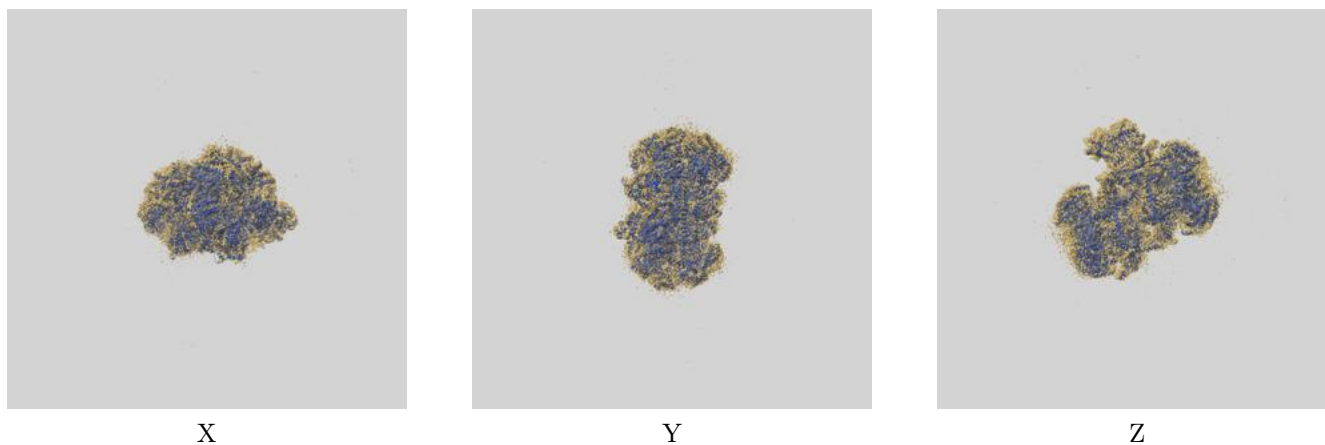
This section was not generated. No FSC curve or half-maps provided.



## 9 Map-model fit [i](#)

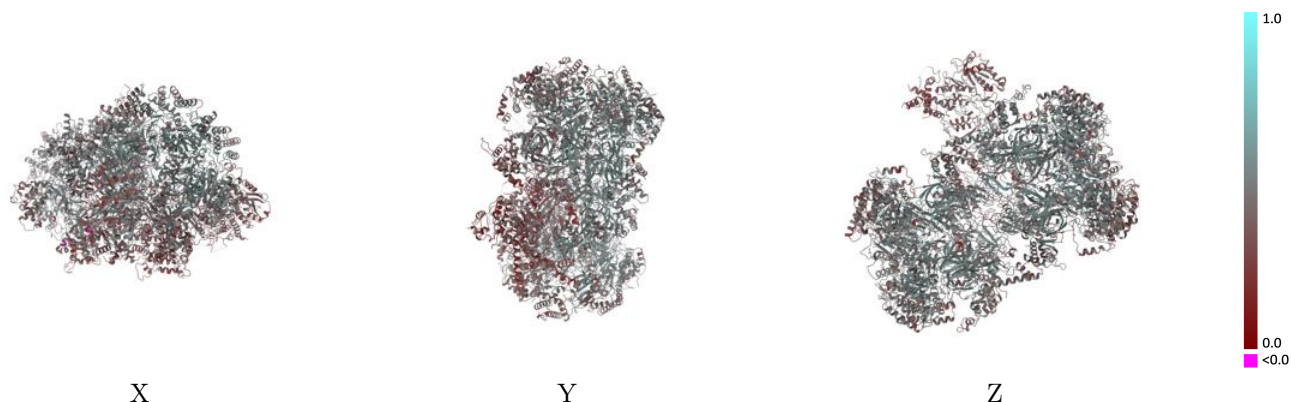
This section contains information regarding the fit between EMDB map EMD-13620 and PDB model 7PT7. Per-residue inclusion information can be found in section [3](#) on page [10](#).

### 9.1 Map-model overlay [i](#)



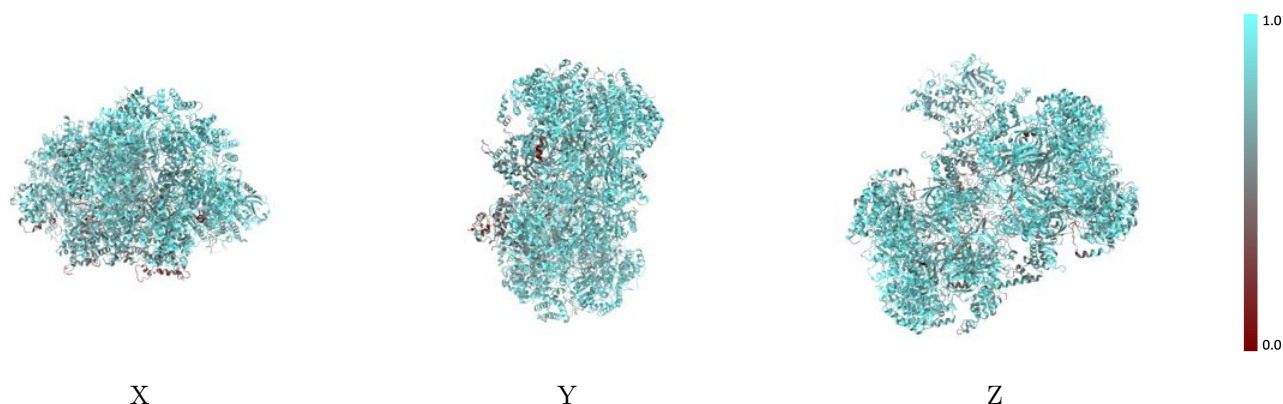
The images above show the 3D surface view of the map at the recommended contour level 0.014 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



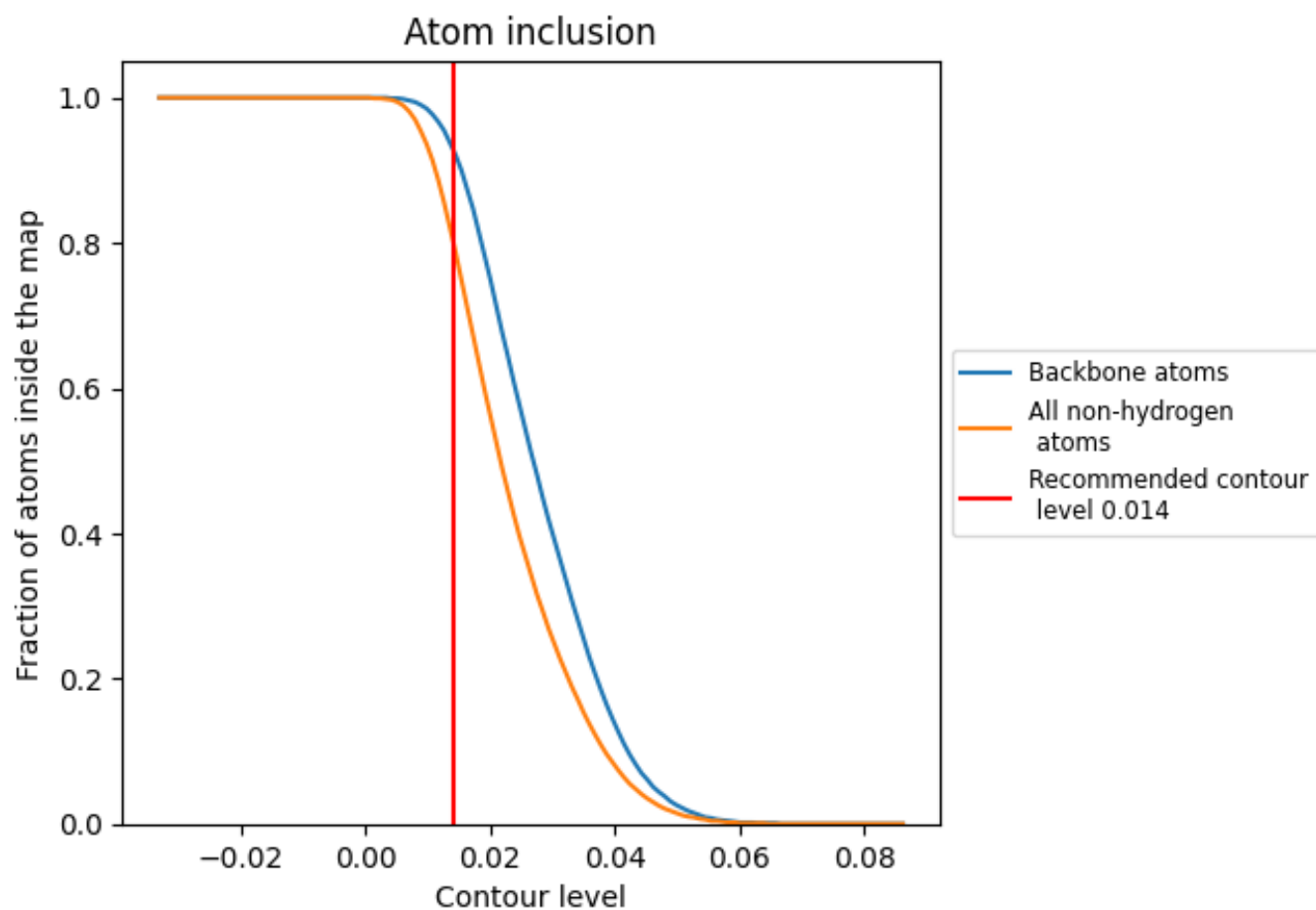
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.014).

































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 93% 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 (0.014) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8030	 0.4450
1	 0.0000	 0.4240
2	 0.7350	 0.4080
3	 0.8750	 0.5000
4	 0.8010	 0.4490
5	 0.8200	 0.4650
6	 0.7330	 0.3940
7	 0.8590	 0.4870
8	 0.7880	 0.3500
9	 0.6570	 0.3090
B	 0.7230	 0.4050
C	 0.8800	 0.5050
D	 0.8350	 0.4750
E	 0.8180	 0.4590
F	 0.7640	 0.4160
G	 0.8730	 0.5010

