



## wwPDB EM Validation Summary Report ⓘ

Dec 18, 2022 – 08:34 pm GMT

PDB ID : 7B2L  
EMDB ID : EMD-11987  
Title : Structure of the endocytic adaptor complex AENTH  
Authors : Klebl, D.P.; Lizarrondo, J.; Sobott, F.; Garcia-Alai, M.; Muench, S.P.  
Deposited on : 2020-11-27  
Resolution : 3.90 Å(reported)  
Based on initial models : 5OO7, 5ONF

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

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.dev43  
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 : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.3

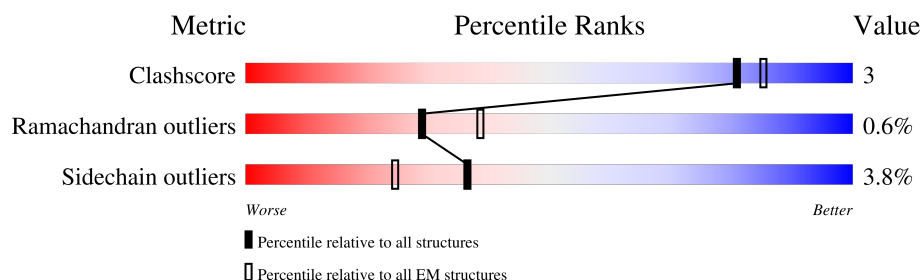
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.90 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	A	162	
1	C	162	
1	F	162	
1	H	162	
1	K	162	
1	M	162	
1	P	162	
1	R	162	

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Mol	Chain	Length	Quality of chain
2	B	291	
2	D	291	
2	G	291	
2	I	291	
2	L	291	
2	N	291	
2	Q	291	
2	S	291	

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 26192 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 ENTH domain of epsin Ent1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	147	Total	C	N	O	S	0	0
			1205	753	213	233	6		
1	C	147	Total	C	N	O	S	0	0
			1205	753	213	233	6		
1	F	147	Total	C	N	O	S	0	0
			1205	753	213	233	6		
1	H	147	Total	C	N	O	S	0	0
			1205	753	213	233	6		
1	K	147	Total	C	N	O	S	0	0
			1205	753	213	233	6		
1	M	147	Total	C	N	O	S	0	0
			1205	753	213	233	6		
1	P	147	Total	C	N	O	S	0	0
			1205	753	213	233	6		
1	R	147	Total	C	N	O	S	0	0
			1205	753	213	233	6		

There are 40 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-4	GLY	-	expression tag	UNP Q12518
A	-3	ALA	-	expression tag	UNP Q12518
A	-2	MET	-	expression tag	UNP Q12518
A	-1	GLY	-	expression tag	UNP Q12518
A	0	SER	-	expression tag	UNP Q12518
C	-4	GLY	-	expression tag	UNP Q12518
C	-3	ALA	-	expression tag	UNP Q12518
C	-2	MET	-	expression tag	UNP Q12518
C	-1	GLY	-	expression tag	UNP Q12518
C	0	SER	-	expression tag	UNP Q12518
F	-4	GLY	-	expression tag	UNP Q12518
F	-3	ALA	-	expression tag	UNP Q12518
F	-2	MET	-	expression tag	UNP Q12518
F	-1	GLY	-	expression tag	UNP Q12518

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Chain	Residue	Modelled	Actual	Comment	Reference
F	0	SER	-	expression tag	UNP Q12518
H	-4	GLY	-	expression tag	UNP Q12518
H	-3	ALA	-	expression tag	UNP Q12518
H	-2	MET	-	expression tag	UNP Q12518
H	-1	GLY	-	expression tag	UNP Q12518
H	0	SER	-	expression tag	UNP Q12518
K	-4	GLY	-	expression tag	UNP Q12518
K	-3	ALA	-	expression tag	UNP Q12518
K	-2	MET	-	expression tag	UNP Q12518
K	-1	GLY	-	expression tag	UNP Q12518
K	0	SER	-	expression tag	UNP Q12518
M	-4	GLY	-	expression tag	UNP Q12518
M	-3	ALA	-	expression tag	UNP Q12518
M	-2	MET	-	expression tag	UNP Q12518
M	-1	GLY	-	expression tag	UNP Q12518
M	0	SER	-	expression tag	UNP Q12518
P	-4	GLY	-	expression tag	UNP Q12518
P	-3	ALA	-	expression tag	UNP Q12518
P	-2	MET	-	expression tag	UNP Q12518
P	-1	GLY	-	expression tag	UNP Q12518
P	0	SER	-	expression tag	UNP Q12518
R	-4	GLY	-	expression tag	UNP Q12518
R	-3	ALA	-	expression tag	UNP Q12518
R	-2	MET	-	expression tag	UNP Q12518
R	-1	GLY	-	expression tag	UNP Q12518
R	0	SER	-	expression tag	UNP Q12518

- Molecule 2 is a protein called ANTH domain of Sla2.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	247	Total 2009	C 1282	N 347	O 371	S 9	0	0
2	D	247	Total 2009	C 1282	N 347	O 371	S 9	0	0
2	G	247	Total 2009	C 1282	N 347	O 371	S 9	0	0
2	I	247	Total 2009	C 1282	N 347	O 371	S 9	0	0
2	L	247	Total 2009	C 1282	N 347	O 371	S 9	0	0
2	N	247	Total 2009	C 1282	N 347	O 371	S 9	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
2	Q	247	Total 2009	C 1282	N 347	O 371	S 9	0	0
2	S	247	Total 2009	C 1282	N 347	O 371	S 9	0	0

There are 40 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-4	GLY	-	expression tag	UNP P33338
B	-3	ALA	-	expression tag	UNP P33338
B	-2	MET	-	expression tag	UNP P33338
B	-1	GLY	-	expression tag	UNP P33338
B	0	SER	-	expression tag	UNP P33338
D	-4	GLY	-	expression tag	UNP P33338
D	-3	ALA	-	expression tag	UNP P33338
D	-2	MET	-	expression tag	UNP P33338
D	-1	GLY	-	expression tag	UNP P33338
D	0	SER	-	expression tag	UNP P33338
G	-4	GLY	-	expression tag	UNP P33338
G	-3	ALA	-	expression tag	UNP P33338
G	-2	MET	-	expression tag	UNP P33338
G	-1	GLY	-	expression tag	UNP P33338
G	0	SER	-	expression tag	UNP P33338
I	-4	GLY	-	expression tag	UNP P33338
I	-3	ALA	-	expression tag	UNP P33338
I	-2	MET	-	expression tag	UNP P33338
I	-1	GLY	-	expression tag	UNP P33338
I	0	SER	-	expression tag	UNP P33338
L	-4	GLY	-	expression tag	UNP P33338
L	-3	ALA	-	expression tag	UNP P33338
L	-2	MET	-	expression tag	UNP P33338
L	-1	GLY	-	expression tag	UNP P33338
L	0	SER	-	expression tag	UNP P33338
N	-4	GLY	-	expression tag	UNP P33338
N	-3	ALA	-	expression tag	UNP P33338
N	-2	MET	-	expression tag	UNP P33338
N	-1	GLY	-	expression tag	UNP P33338
N	0	SER	-	expression tag	UNP P33338
Q	-4	GLY	-	expression tag	UNP P33338
Q	-3	ALA	-	expression tag	UNP P33338
Q	-2	MET	-	expression tag	UNP P33338
Q	-1	GLY	-	expression tag	UNP P33338

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Chain	Residue	Modelled	Actual	Comment	Reference
Q	0	SER	-	expression tag	UNP P33338
S	-4	GLY	-	expression tag	UNP P33338
S	-3	ALA	-	expression tag	UNP P33338
S	-2	MET	-	expression tag	UNP P33338
S	-1	GLY	-	expression tag	UNP P33338
S	0	SER	-	expression tag	UNP P33338

- # PIO

Mol	Chain	Residues	Atoms				AltConf
3	A	1	Total 48	C 12	O 30	P 6	0
3	A	1	Total 48	C 12	O 30	P 6	0
3	B	1	Total 24	C 6	O 15	P 3	0
3	C	1	Total 48	C 12	O 30	P 6	0
3	C	1	Total 48	C 12	O 30	P 6	0
3	F	1	Total 48	C 12	O 30	P 6	0
3	F	1	Total 48	C 12	O 30	P 6	0



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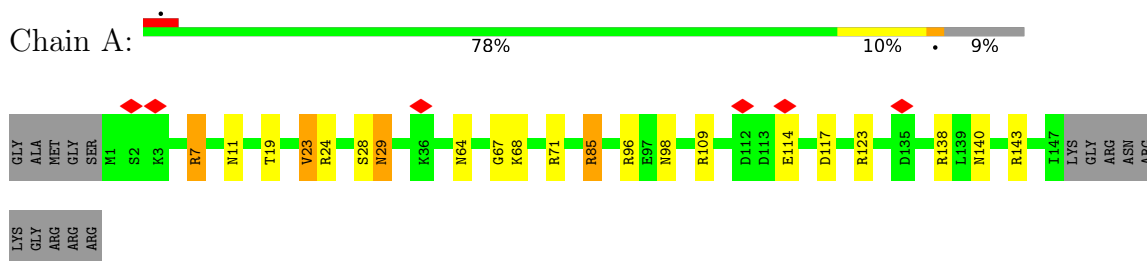
Mol	Chain	Residues	Atoms				AltConf
3	G	1	Total	C	O	P	0
			24	6	15	3	
3	H	1	Total	C	O	P	0
			48	12	30	6	
3	H	1	Total	C	O	P	0
			48	12	30	6	
3	K	1	Total	C	O	P	0
			48	12	30	6	
3	K	1	Total	C	O	P	0
			48	12	30	6	
3	L	1	Total	C	O	P	0
			24	6	15	3	
3	M	1	Total	C	O	P	0
			48	12	30	6	
3	M	1	Total	C	O	P	0
			48	12	30	6	
3	P	1	Total	C	O	P	0
			48	12	30	6	
3	P	1	Total	C	O	P	0
			48	12	30	6	
3	Q	1	Total	C	O	P	0
			24	6	15	3	
3	R	1	Total	C	O	P	0
			48	12	30	6	
3	R	1	Total	C	O	P	0
			48	12	30	6	



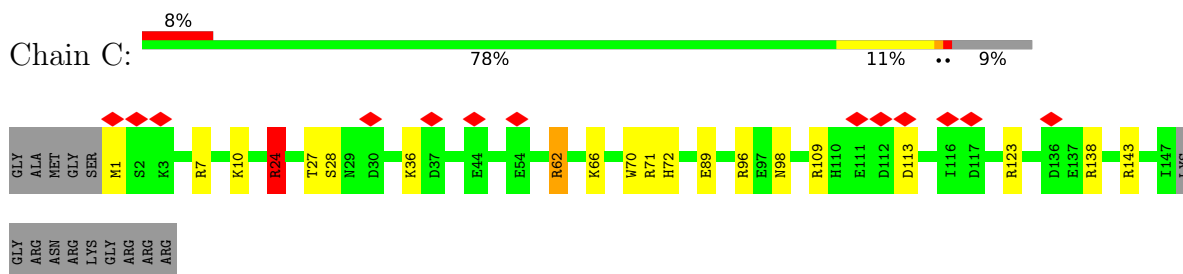
### 3 Residue-property plots [i](#)

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.

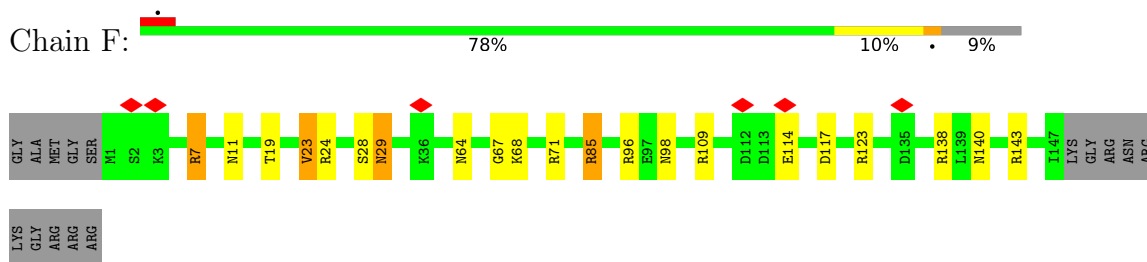
- Molecule 1: ENTH domain of epsin Ent1



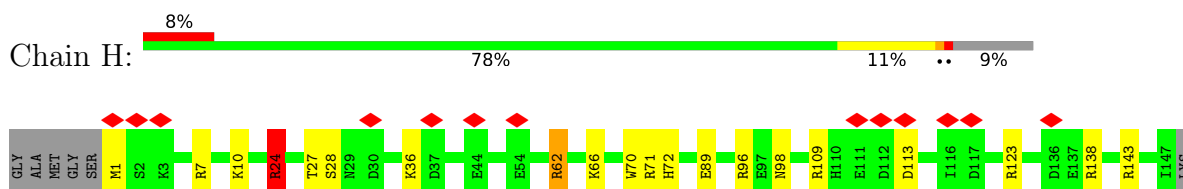
- Molecule 1: ENTH domain of epsin Ent1



- Molecule 1: ENTH domain of epsin Ent1




- Molecule 1: ENTH domain of epsin Ent1



GLY  
ARG  
ASN  
ARG  
GLY  
LYS  
GLY  
ARG  
ARG


- Molecule 1: ENTH domain of epsin Ent1

Chain K:  78% 10% 9%

GLY  
ALA  
MET  
GLY  
SER  
M1  
S2  
K3  
R7  
N11  
T19  
V23  
R24  
S28  
N29  
K36  
N64  
G67  
K68  
R71  
R85  
R96  
E97  
N98  
R109  
D112  
D113  
E114  
D117  
R123  
D135  
R138  
L139  
N140  
R143  
I147  
LYS  
GLY  
ARG  
ASN  
ARG

LYS  
GLY  
ARG  
ARG  
ARG


- Molecule 1: ENTH domain of epsin Ent1

Chain M:  8% 78% 11% 9%

GLY  
ALA  
MET  
GLY  
SER  
M1  
S2  
K3  
R7  
K10  
R24  
T27  
S28  
N29  
D30  
K36  
D37  
E44  
E54  
R62  
K66  
W70  
R71  
H72  
E89  
R96  
E97  
N98  
R109  
H110  
E111  
D112  
D113  
I116  
D117  
R123  
D135  
R138  
L139  
N140  
R143  
I147  
D136  
E137  
R138  
R143  
I147  
LYS

GLY  
ARG  
ASN  
ARG  
LYS  
GLY  
ARG  
ARG  
ARG


- Molecule 1: ENTH domain of epsin Ent1

Chain P:  78% 10% 9%

GLY  
ALA  
MET  
GLY  
SER  
M1  
S2  
K3  
R7  
M11  
T19  
V23  
R24  
S28  
N29  
D30  
K36  
N64  
G67  
K68  
R71  
R85  
R96  
E97  
N98  
R109  
D112  
D113  
E114  
D117  
R123  
D135  
R138  
L139  
N140  
R143  
I147  
LYS  
GLY  
ARG  
ASN  
ARG

LYS  
GLY  
ARG  
ARG


- Molecule 1: ENTH domain of epsin Ent1

Chain R:  8% 78% 11% 9%

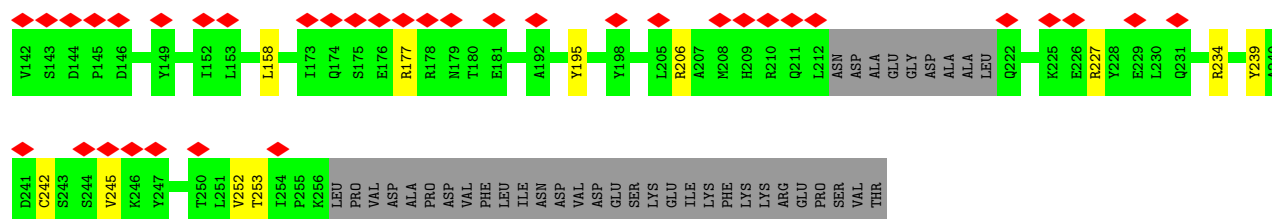
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MET  
GLY  
SER  
M1  
S2  
K3  
R7  
K10  
R24  
T27  
S28  
N29  
D30  
K36  
D37  
E44  
E54  
R62  
K66  
W70  
R71  
H72  
E89  
R96  
E97  
N98  
R109  
H110  
E111  
D112  
D113  
I116  
D117  
R123  
D135  
R138  
L139  
N140  
R143  
I147  
D136  
E137  
R138  
R143  
I147  
LYS

GLY  
ARG  
ASN  
ARG  
LYS  
GLY  
ARG  
ARG  
ARG

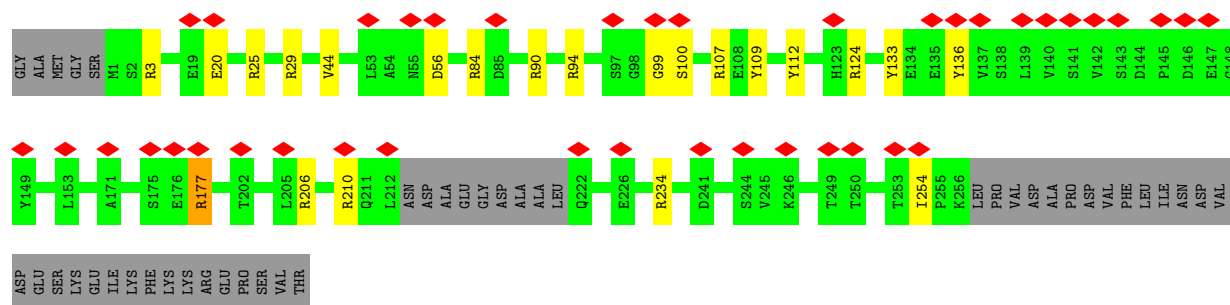
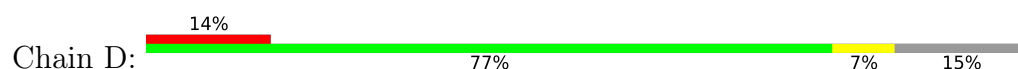
- Molecule 2: ANTH domain of Sla2

Chain B:  21% 76% 8% 15%

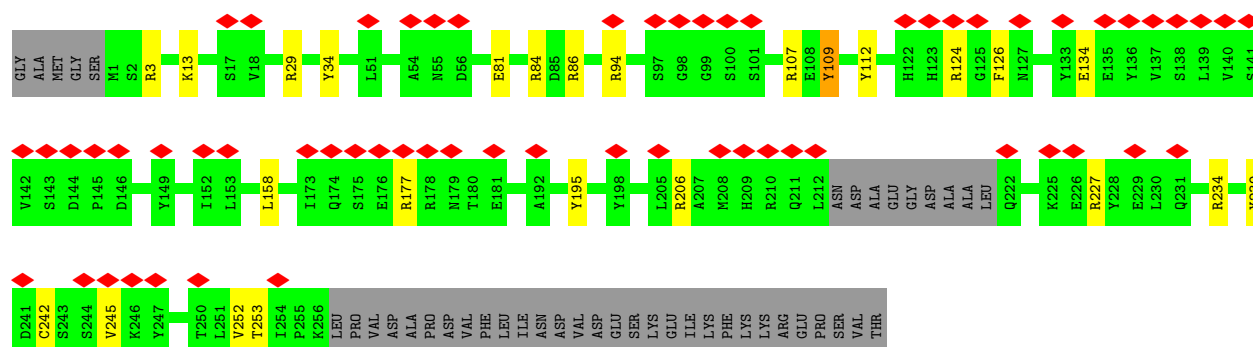
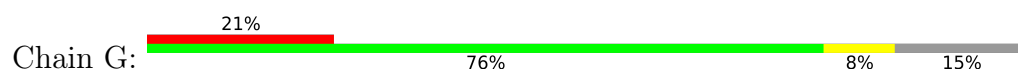
GLY  
MET  
SER  
M1  
S2  
R3  
K13  
S17  
V18  
R29  
Y34  
I51  
A54  
N55  
D56  
E81  
R84  
D85  
R86  
R94  
S97  
G98  
G99  
S100  
S101  
R107  
E108  
Y109  
Y112  
H122  
H123  
R124  
G125  
F126  
N127  
Y133  
E134  
E135  
Y136  
V137  
S138  
L139  
V140  
S141



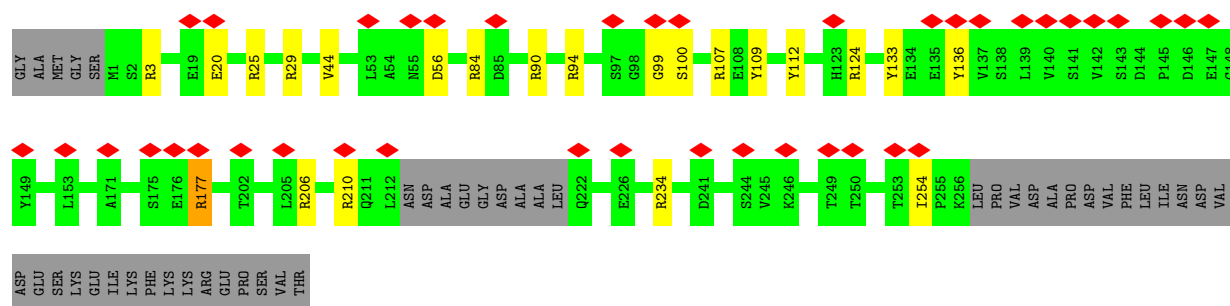
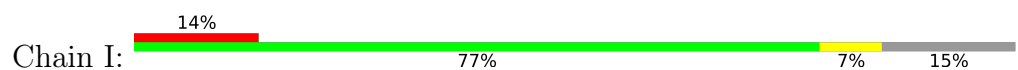
• Molecule 2: ANTH domain of Sla2



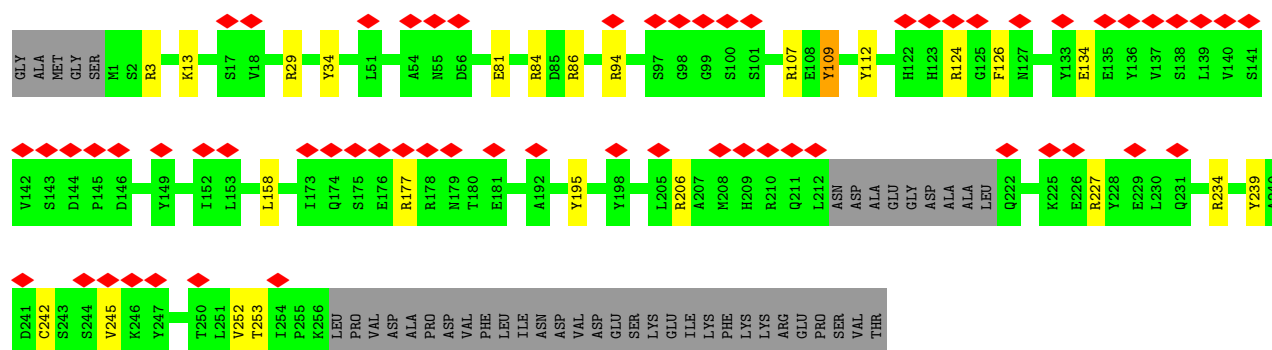
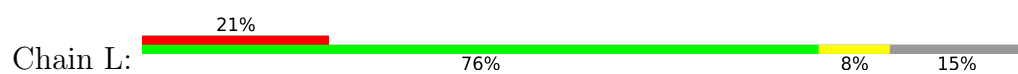
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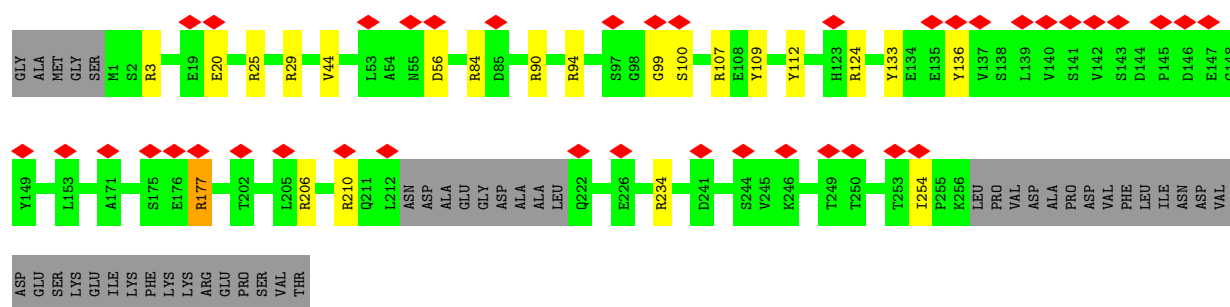
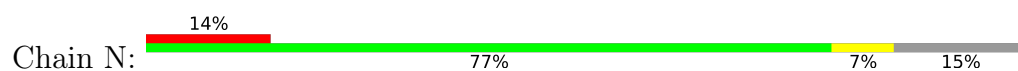
• Molecule 2: ANTH domain of Sla2



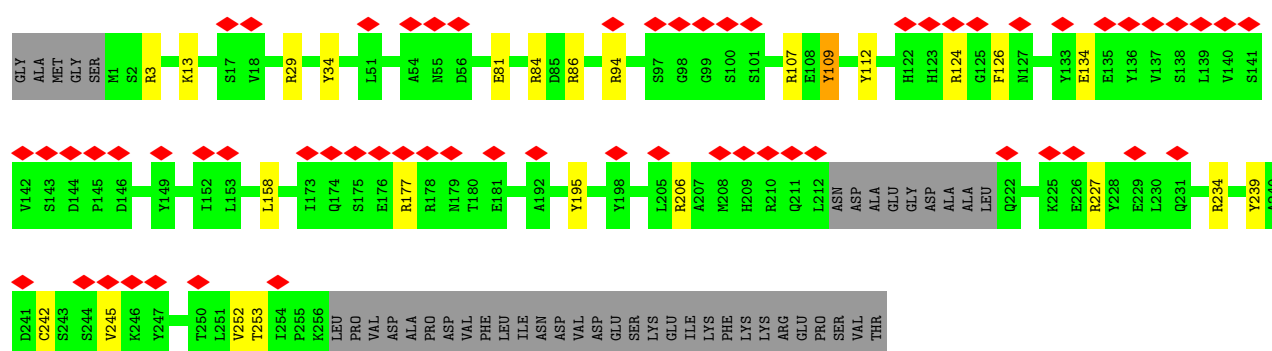
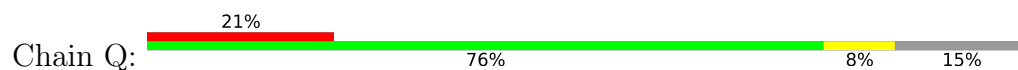
• Molecule 2: ANTH domain of Sla2



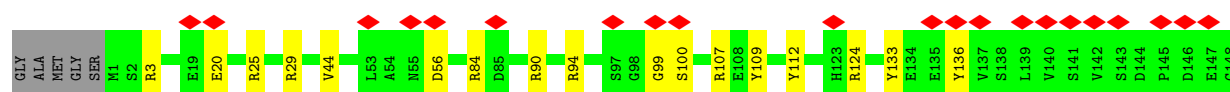
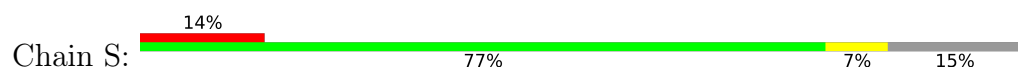
• Molecule 2: ANTH domain of Sla2

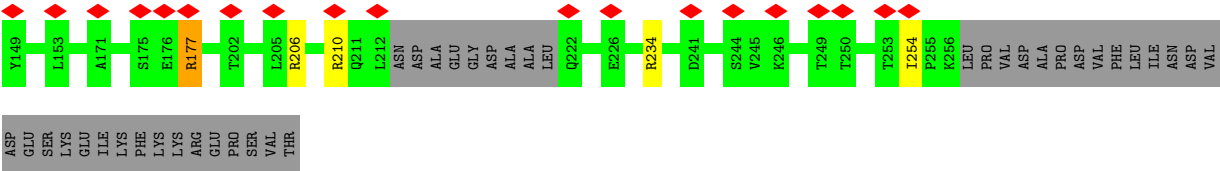


• Molecule 2: ANTH domain of Sla2



• Molecule 2: ANTH domain of Sla2





## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	79414	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	75.2	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	6.189	Depositor
Minimum map value	-2.946	Depositor
Average map value	0.034	Depositor
Map value standard deviation	0.230	Depositor
Recommended contour level	1.2	Depositor
Map size (Å)	255.6, 255.6, 255.6	wwPDB
Map dimensions	240, 240, 240	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.065, 1.065, 1.065	Depositor

## 5 Model quality

### 5.1 Standard geometry

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

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	0.68	1/1221 (0.1%)	1.14	8/1638 (0.5%)
1	C	0.65	0/1221	1.11	7/1638 (0.4%)
1	F	0.68	1/1221 (0.1%)	1.14	8/1638 (0.5%)
1	H	0.65	0/1221	1.11	7/1638 (0.4%)
1	K	0.68	1/1221 (0.1%)	1.14	8/1638 (0.5%)
1	M	0.65	0/1221	1.11	7/1638 (0.4%)
1	P	0.68	1/1221 (0.1%)	1.14	8/1638 (0.5%)
1	R	0.65	0/1221	1.11	7/1638 (0.4%)
2	B	0.68	0/2050	1.06	11/2765 (0.4%)
2	D	0.67	0/2050	1.08	13/2765 (0.5%)
2	G	0.68	0/2050	1.06	11/2765 (0.4%)
2	I	0.67	0/2050	1.08	13/2765 (0.5%)
2	L	0.68	0/2050	1.06	11/2765 (0.4%)
2	N	0.67	0/2050	1.08	13/2765 (0.5%)
2	Q	0.68	0/2050	1.06	11/2765 (0.4%)
2	S	0.67	0/2050	1.08	13/2765 (0.5%)
All	All	0.67	4/26168 (0.0%)	1.09	156/35224 (0.4%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2
1	F	0	2
1	K	0	2
1	P	0	2
2	B	0	3
2	D	0	2
2	G	0	3

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Mol	Chain	#Chirality outliers	#Planarity outliers
2	I	0	2
2	L	0	3
2	N	0	2
2	Q	0	3
2	S	0	2
All	All	0	28

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	23	VAL	C-O	-6.42	1.11	1.23
1	F	23	VAL	C-O	-6.42	1.11	1.23
1	K	23	VAL	C-O	-6.42	1.11	1.23
1	P	23	VAL	C-O	-6.42	1.11	1.23

The worst 5 of 156 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	71	ARG	NE-CZ-NH1	9.03	124.82	120.30
1	H	71	ARG	NE-CZ-NH1	9.03	124.82	120.30
1	M	71	ARG	NE-CZ-NH1	9.03	124.82	120.30
1	R	71	ARG	NE-CZ-NH1	9.03	124.82	120.30
2	D	3	ARG	NE-CZ-NH1	9.02	124.81	120.30

There are no chirality outliers.

5 of 28 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	28	SER	Mainchain
1	A	85	ARG	Sidechain
2	B	109	TYR	Sidechain
2	B	112	TYR	Sidechain
2	B	86	ARG	Sidechain

## 5.2 Too-close contacts

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



Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1205	0	1203	6	0
1	C	1205	0	1203	10	0
1	F	1205	0	1203	6	0
1	H	1205	0	1203	10	0
1	K	1205	0	1203	6	0
1	M	1205	0	1203	10	0
1	P	1205	0	1203	6	0
1	R	1205	0	1203	9	0
2	B	2009	0	2023	3	0
2	D	2009	0	2023	2	0
2	G	2009	0	2023	3	0
2	I	2009	0	2023	2	0
2	L	2009	0	2023	3	0
2	N	2009	0	2023	2	0
2	Q	2009	0	2023	3	0
2	S	2009	0	2023	2	0
3	A	48	0	18	7	0
3	B	24	0	9	2	0
3	C	48	0	18	16	0
3	F	48	0	18	9	0
3	G	24	0	9	1	0
3	H	48	0	18	16	0
3	K	48	0	18	8	0
3	L	24	0	9	2	0
3	M	48	0	18	16	0
3	P	48	0	18	8	0
3	Q	24	0	9	2	0
3	R	48	0	18	15	0
All	All	26192	0	25988	134	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 3.

The worst 5 of 134 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:P:7:ARG:HD3	3:P:201:PIO:O53	1.38	1.22
1:A:7:ARG:HD3	3:A:201:PIO:O52	1.38	1.21
1:F:7:ARG:HD3	3:F:201:PIO:O52	1.38	1.18
1:K:7:ARG:HD3	3:K:201:PIO:O53	1.38	1.18
1:C:7:ARG:HD2	3:C:301:PIO:O52	1.82	0.79

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	145/162 (90%)	133 (92%)	12 (8%)	0	100	100
1	C	145/162 (90%)	138 (95%)	6 (4%)	1 (1%)	22	60
1	F	145/162 (90%)	133 (92%)	12 (8%)	0	100	100
1	H	145/162 (90%)	138 (95%)	6 (4%)	1 (1%)	22	60
1	K	145/162 (90%)	133 (92%)	12 (8%)	0	100	100
1	M	145/162 (90%)	138 (95%)	6 (4%)	1 (1%)	22	60
1	P	145/162 (90%)	133 (92%)	12 (8%)	0	100	100
1	R	145/162 (90%)	138 (95%)	6 (4%)	1 (1%)	22	60
2	B	243/291 (84%)	227 (93%)	15 (6%)	1 (0%)	34	71
2	D	243/291 (84%)	228 (94%)	12 (5%)	3 (1%)	13	49
2	G	243/291 (84%)	227 (93%)	15 (6%)	1 (0%)	34	71
2	I	243/291 (84%)	228 (94%)	12 (5%)	3 (1%)	13	49
2	L	243/291 (84%)	227 (93%)	15 (6%)	1 (0%)	34	71
2	N	243/291 (84%)	228 (94%)	12 (5%)	3 (1%)	13	49
2	Q	243/291 (84%)	227 (93%)	15 (6%)	1 (0%)	34	71
2	S	243/291 (84%)	228 (94%)	12 (5%)	3 (1%)	13	49
All	All	3104/3624 (86%)	2904 (94%)	180 (6%)	20 (1%)	29	63

5 of 20 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	113	ASP
1	H	113	ASP
1	M	113	ASP
1	R	113	ASP

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Mol	Chain	Res	Type
2	D	254	ILE

### 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	134/144 (93%)	126 (94%)	8 (6%)	19	49
1	C	134/144 (93%)	125 (93%)	9 (7%)	16	46
1	F	134/144 (93%)	126 (94%)	8 (6%)	19	49
1	H	134/144 (93%)	125 (93%)	9 (7%)	16	46
1	K	134/144 (93%)	126 (94%)	8 (6%)	19	49
1	M	134/144 (93%)	125 (93%)	9 (7%)	16	46
1	P	134/144 (93%)	126 (94%)	8 (6%)	19	49
1	R	134/144 (93%)	125 (93%)	9 (7%)	16	46
2	B	223/259 (86%)	217 (97%)	6 (3%)	44	67
2	D	223/259 (86%)	219 (98%)	4 (2%)	59	77
2	G	223/259 (86%)	217 (97%)	6 (3%)	44	67
2	I	223/259 (86%)	219 (98%)	4 (2%)	59	77
2	L	223/259 (86%)	217 (97%)	6 (3%)	44	67
2	N	223/259 (86%)	219 (98%)	4 (2%)	59	77
2	Q	223/259 (86%)	217 (97%)	6 (3%)	44	67
2	S	223/259 (86%)	219 (98%)	4 (2%)	59	77
All	All	2856/3224 (89%)	2748 (96%)	108 (4%)	36	59

5 of 108 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	K	68	LYS
1	M	36	LYS
1	R	62	ARG
1	K	114	GLU

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Mol	Chain	Res	Type
2	L	134	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 15 such sidechains are listed below:

Mol	Chain	Res	Type
1	K	25	ASN
1	R	25	ASN
1	M	11	ASN
1	R	29	ASN
1	P	25	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](#)

20 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	$\# Z  > 2$
3	PIO	K	201	-	24,24,47	1.34	4 (16%)	36,39,65	0.70	0
3	PIO	C	301	-	24,24,47	1.36	4 (16%)	36,39,65	0.71	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	PIO	K	202	-	24,24,47	1.35	4 (16%)	36,39,65	0.69	0
3	PIO	A	201	-	24,24,47	1.33	4 (16%)	36,39,65	0.70	0
3	PIO	P	202	-	24,24,47	1.35	4 (16%)	36,39,65	0.69	0
3	PIO	F	202	-	24,24,47	1.35	4 (16%)	36,39,65	0.68	0
3	PIO	H	301	-	24,24,47	1.36	4 (16%)	36,39,65	0.71	0
3	PIO	P	201	-	24,24,47	1.34	4 (16%)	36,39,65	0.70	0
3	PIO	F	201	-	24,24,47	1.33	4 (16%)	36,39,65	0.70	0
3	PIO	B	301	-	24,24,47	1.30	4 (16%)	36,39,65	0.70	0
3	PIO	R	302	-	24,24,47	1.33	4 (16%)	36,39,65	0.75	1 (2%)
3	PIO	M	301	-	24,24,47	1.56	4 (16%)	36,39,65	0.73	0
3	PIO	G	301	-	24,24,47	1.30	4 (16%)	36,39,65	0.70	0
3	PIO	L	301	-	24,24,47	1.51	4 (16%)	36,39,65	0.70	0
3	PIO	Q	301	-	24,24,47	1.51	4 (16%)	36,39,65	0.70	0
3	PIO	C	302	-	24,24,47	1.55	4 (16%)	36,39,65	0.75	1 (2%)
3	PIO	M	302	-	24,24,47	1.33	4 (16%)	36,39,65	0.75	1 (2%)
3	PIO	A	202	-	24,24,47	1.35	4 (16%)	36,39,65	0.68	0
3	PIO	H	302	-	24,24,47	1.55	4 (16%)	36,39,65	0.75	1 (2%)
3	PIO	R	301	-	24,24,47	1.56	4 (16%)	36,39,65	0.73	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	PIO	K	201	-	-	4/15/39/68	0/1/1/1
3	PIO	C	301	-	-	4/15/39/68	0/1/1/1
3	PIO	K	202	-	-	3/15/39/68	0/1/1/1
3	PIO	A	201	-	-	6/15/39/68	0/1/1/1
3	PIO	P	202	-	-	3/15/39/68	0/1/1/1
3	PIO	F	202	-	-	2/15/39/68	0/1/1/1
3	PIO	H	301	-	-	4/15/39/68	0/1/1/1
3	PIO	P	201	-	-	4/15/39/68	0/1/1/1
3	PIO	F	201	-	-	6/15/39/68	0/1/1/1
3	PIO	B	301	-	-	1/15/39/68	0/1/1/1
3	PIO	R	302	-	-	3/15/39/68	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	PIO	M	301	-	-	3/15/39/68	0/1/1/1
3	PIO	G	301	-	-	1/15/39/68	0/1/1/1
3	PIO	L	301	-	-	2/15/39/68	0/1/1/1
3	PIO	Q	301	-	-	2/15/39/68	0/1/1/1
3	PIO	C	302	-	-	2/15/39/68	0/1/1/1
3	PIO	M	302	-	-	3/15/39/68	0/1/1/1
3	PIO	A	202	-	-	2/15/39/68	0/1/1/1
3	PIO	H	302	-	-	2/15/39/68	0/1/1/1
3	PIO	R	301	-	-	3/15/39/68	0/1/1/1

The worst 5 of 80 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	302	PIO	P1-O12	4.55	1.65	1.50
3	H	302	PIO	P1-O12	4.55	1.65	1.50
3	M	301	PIO	P1-O12	4.53	1.65	1.50
3	R	301	PIO	P1-O12	4.53	1.65	1.50
3	L	301	PIO	P1-O12	4.52	1.65	1.50

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	302	PIO	C5-C6-C1	2.59	114.33	108.96
3	H	302	PIO	C5-C6-C1	2.59	114.33	108.96
3	M	302	PIO	C5-C6-C1	2.59	114.33	108.96
3	R	302	PIO	C5-C6-C1	2.59	114.33	108.96

There are no chirality outliers.

5 of 60 torsion outliers are listed below:

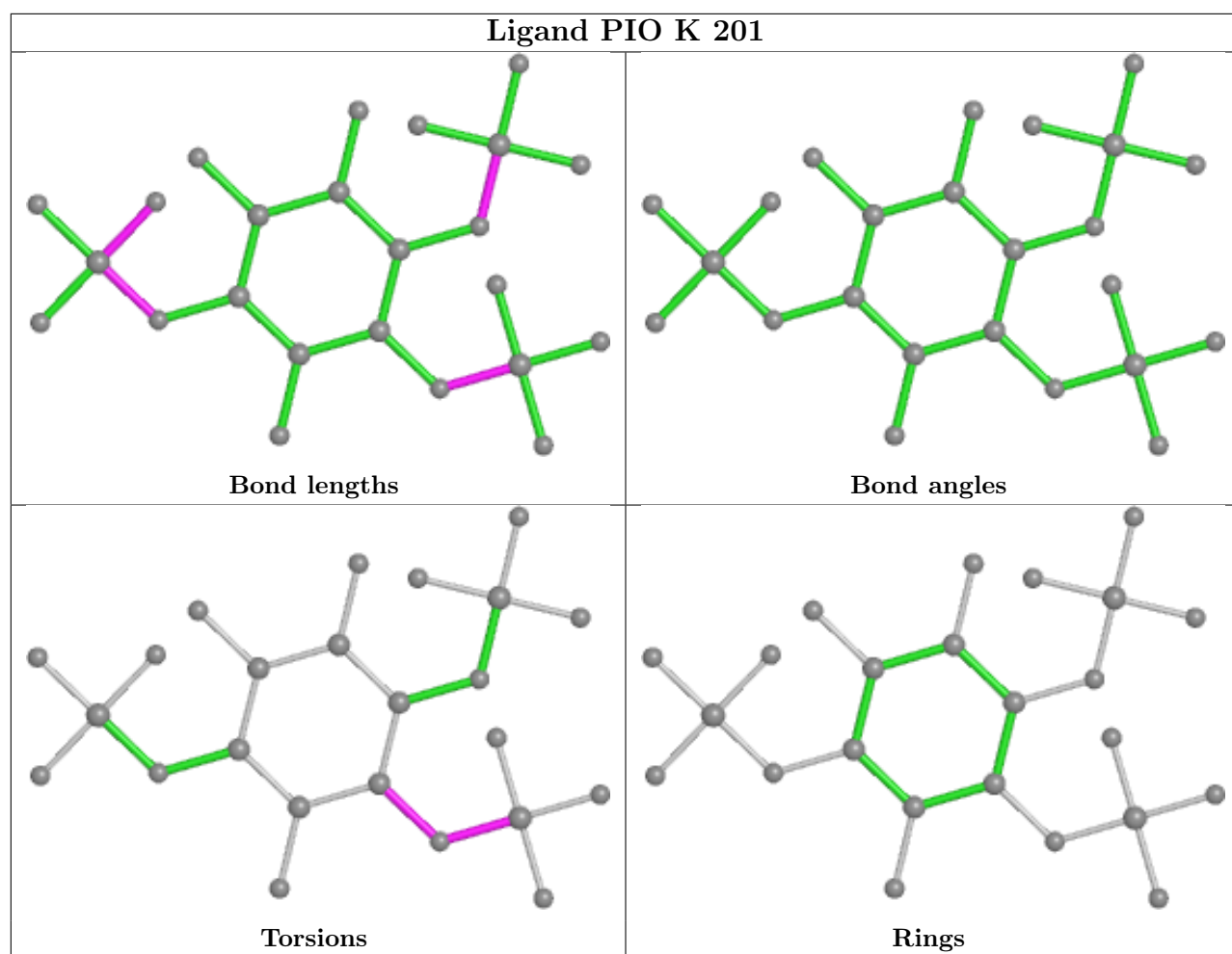
Mol	Chain	Res	Type	Atoms
3	A	201	PIO	C4-O4-P4-O43
3	A	201	PIO	C4-C5-O5-P5
3	A	201	PIO	C6-C5-O5-P5
3	A	202	PIO	C4-C5-O5-P5
3	A	202	PIO	C6-C5-O5-P5

There are no ring outliers.

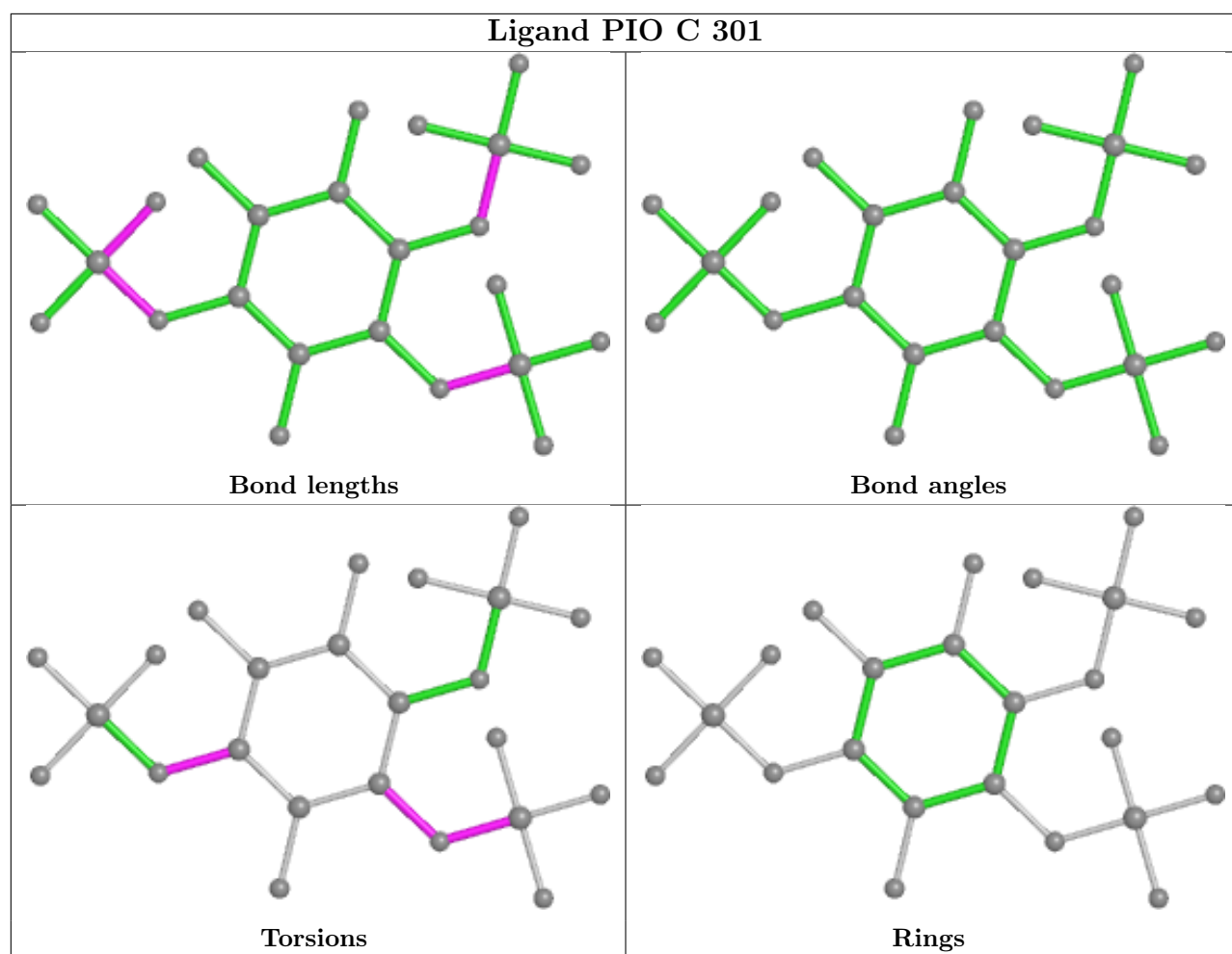
20 monomers are involved in 102 short contacts:

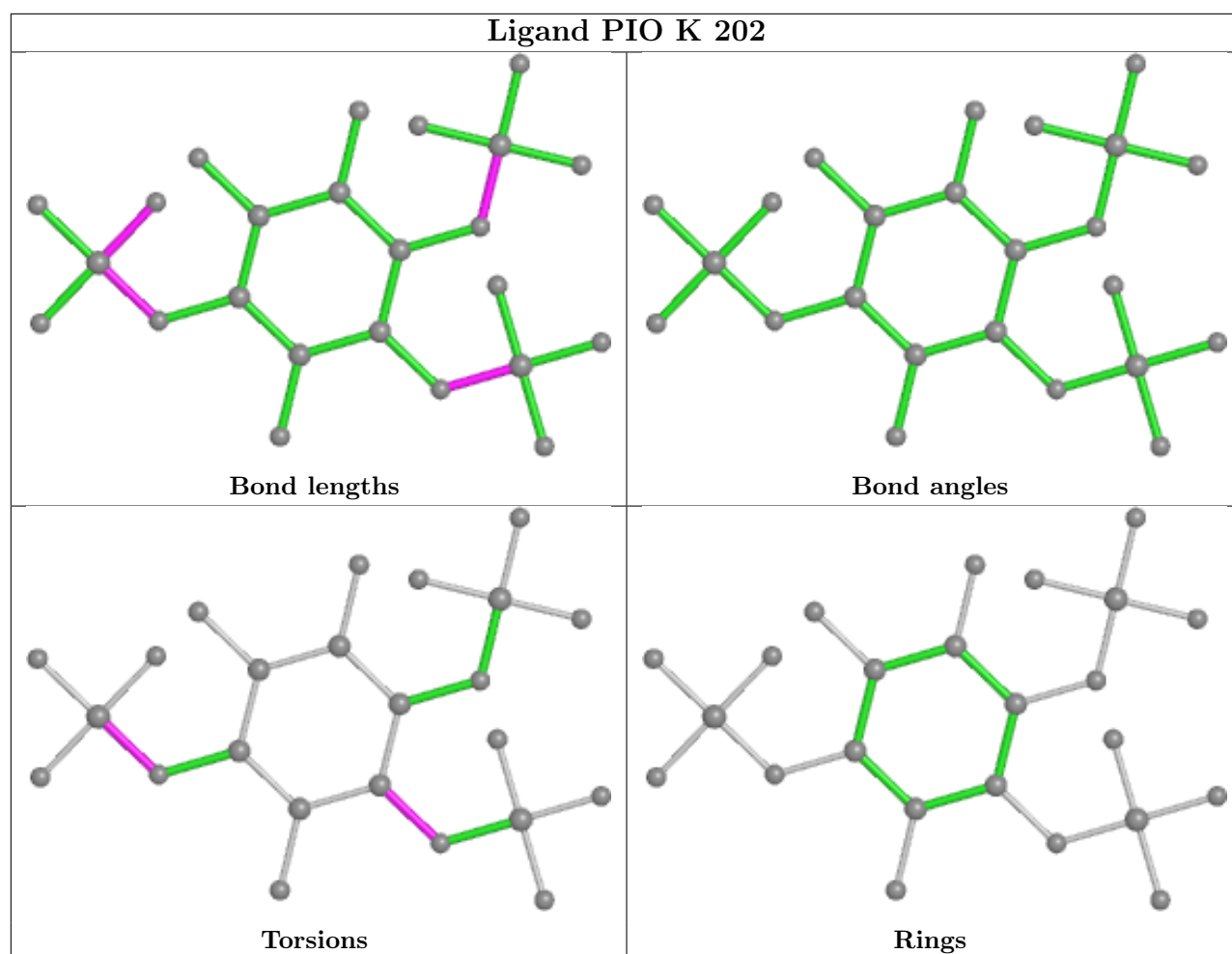
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	K	201	PIO	6	0
3	C	301	PIO	12	0
3	K	202	PIO	2	0
3	A	201	PIO	5	0
3	P	202	PIO	2	0
3	F	202	PIO	3	0
3	H	301	PIO	12	0
3	P	201	PIO	6	0
3	F	201	PIO	6	0
3	B	301	PIO	2	0
3	R	302	PIO	4	0
3	M	301	PIO	12	0
3	G	301	PIO	1	0
3	L	301	PIO	2	0
3	Q	301	PIO	2	0
3	C	302	PIO	4	0
3	M	302	PIO	4	0
3	A	202	PIO	2	0
3	H	302	PIO	4	0
3	R	301	PIO	11	0

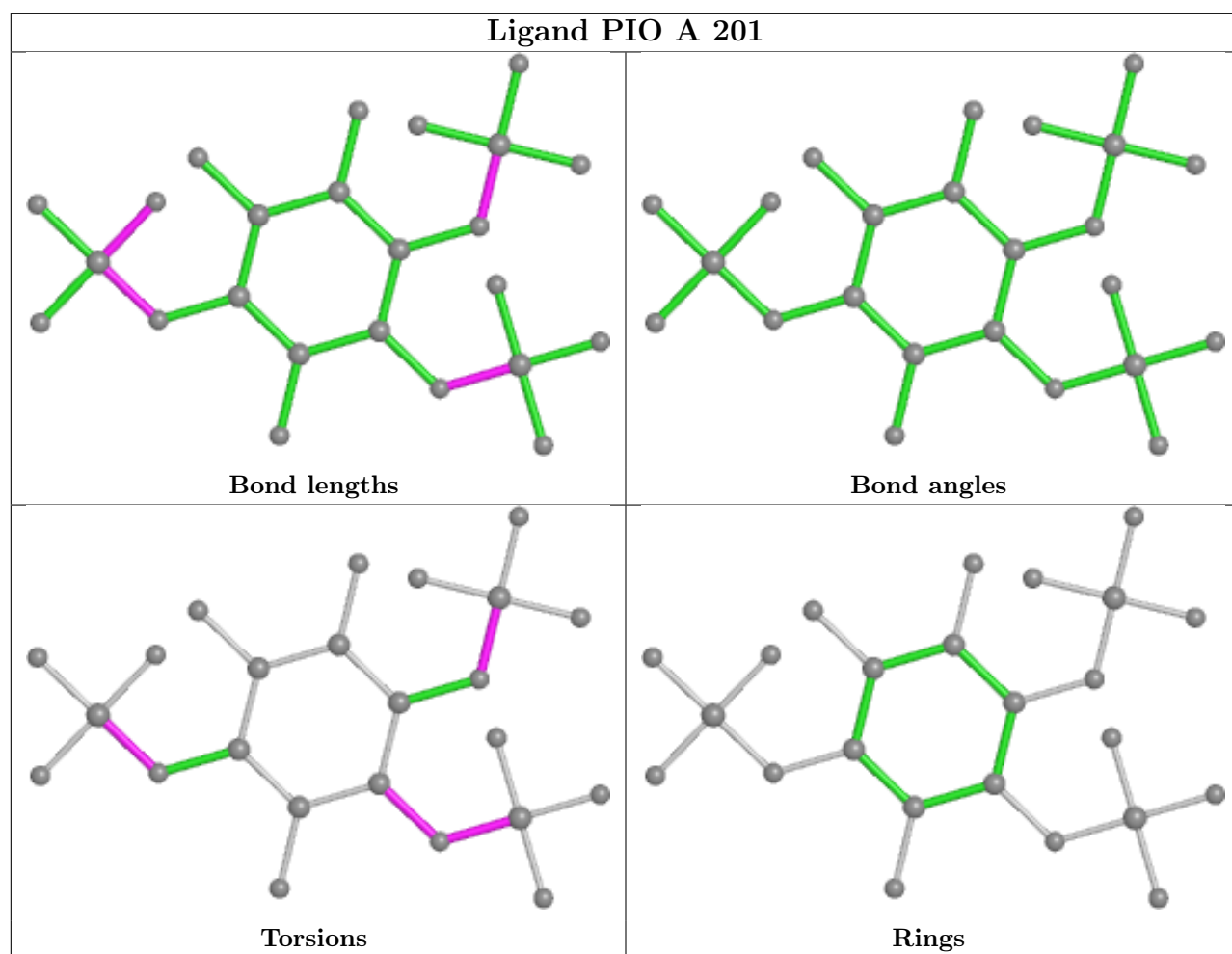
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

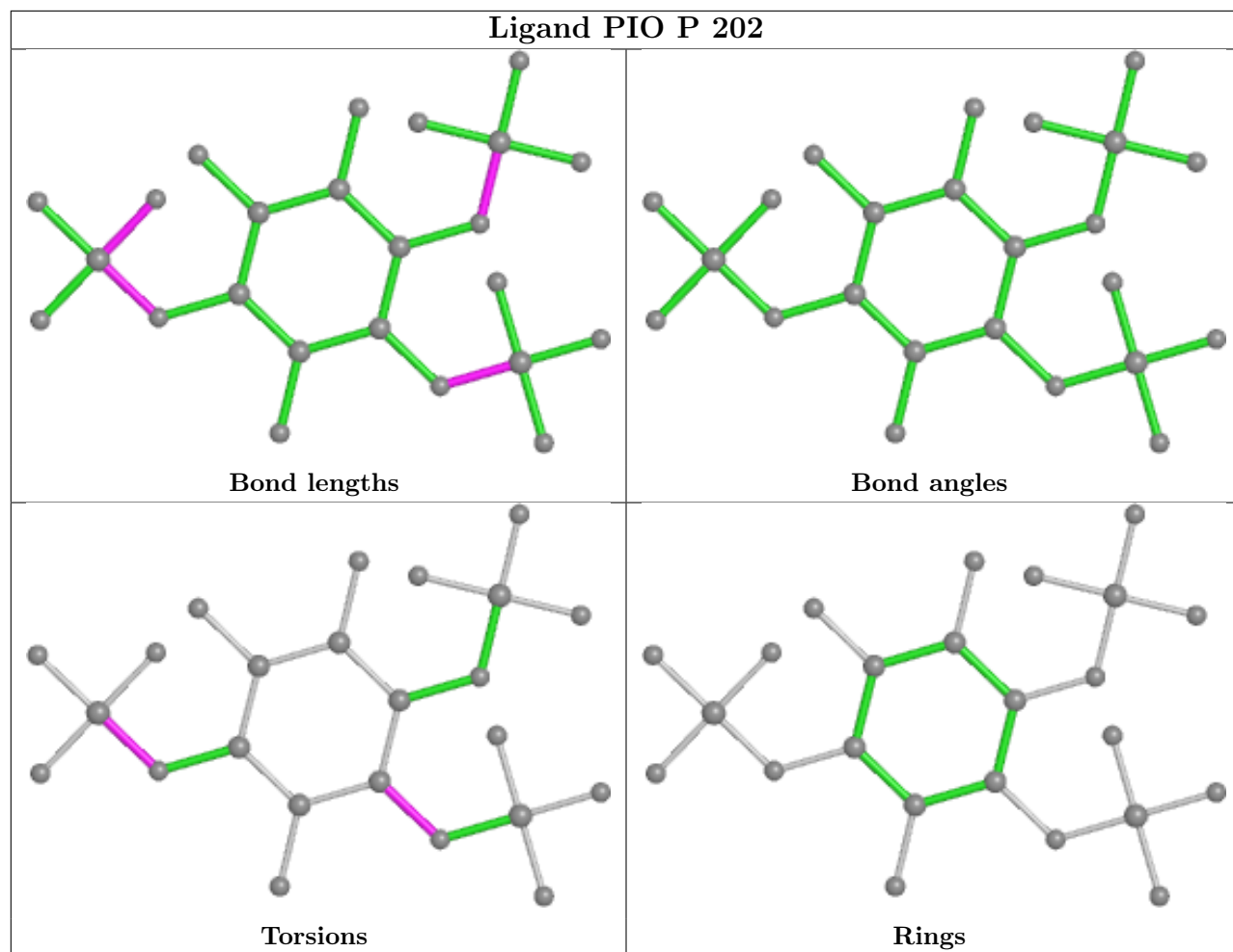


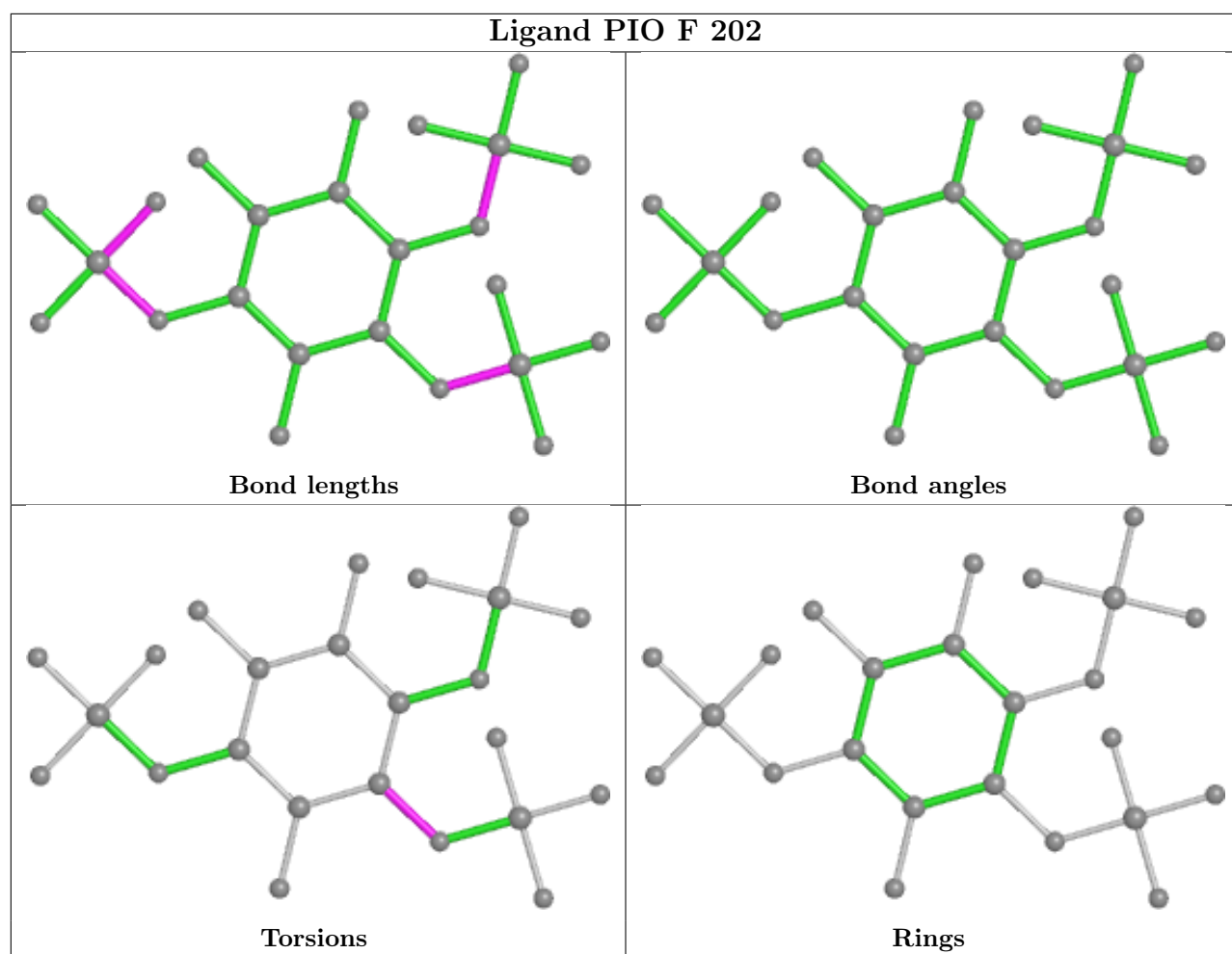


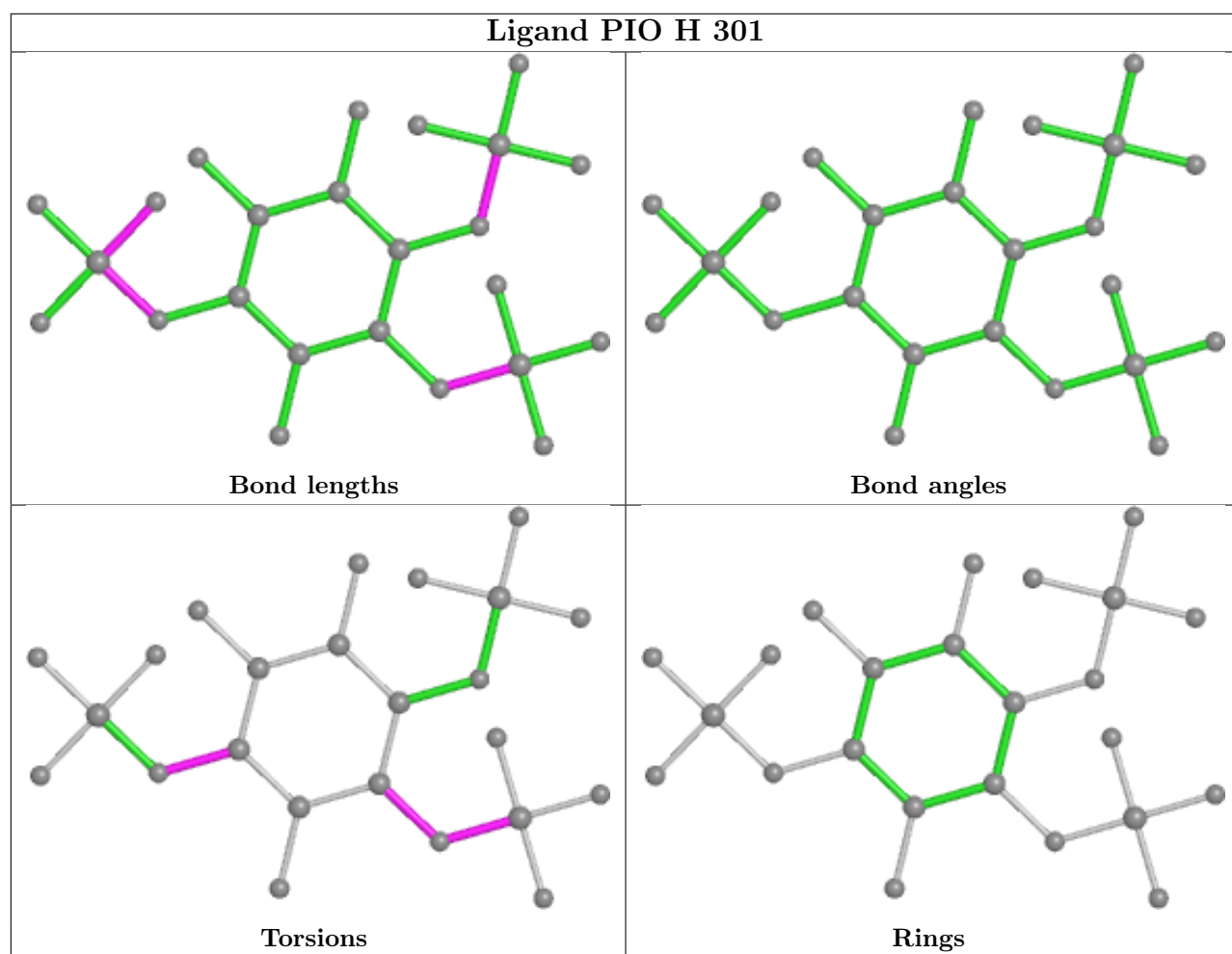


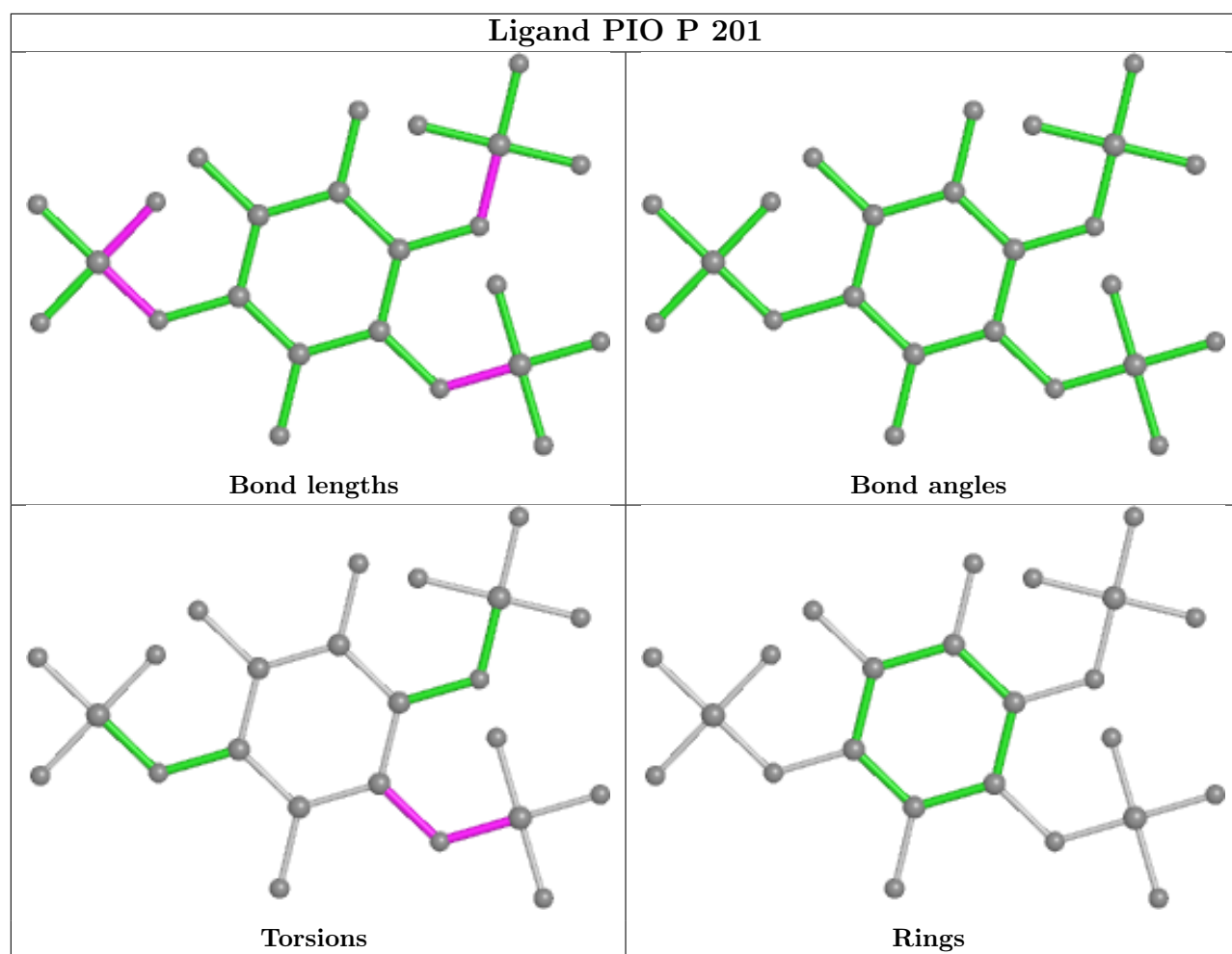


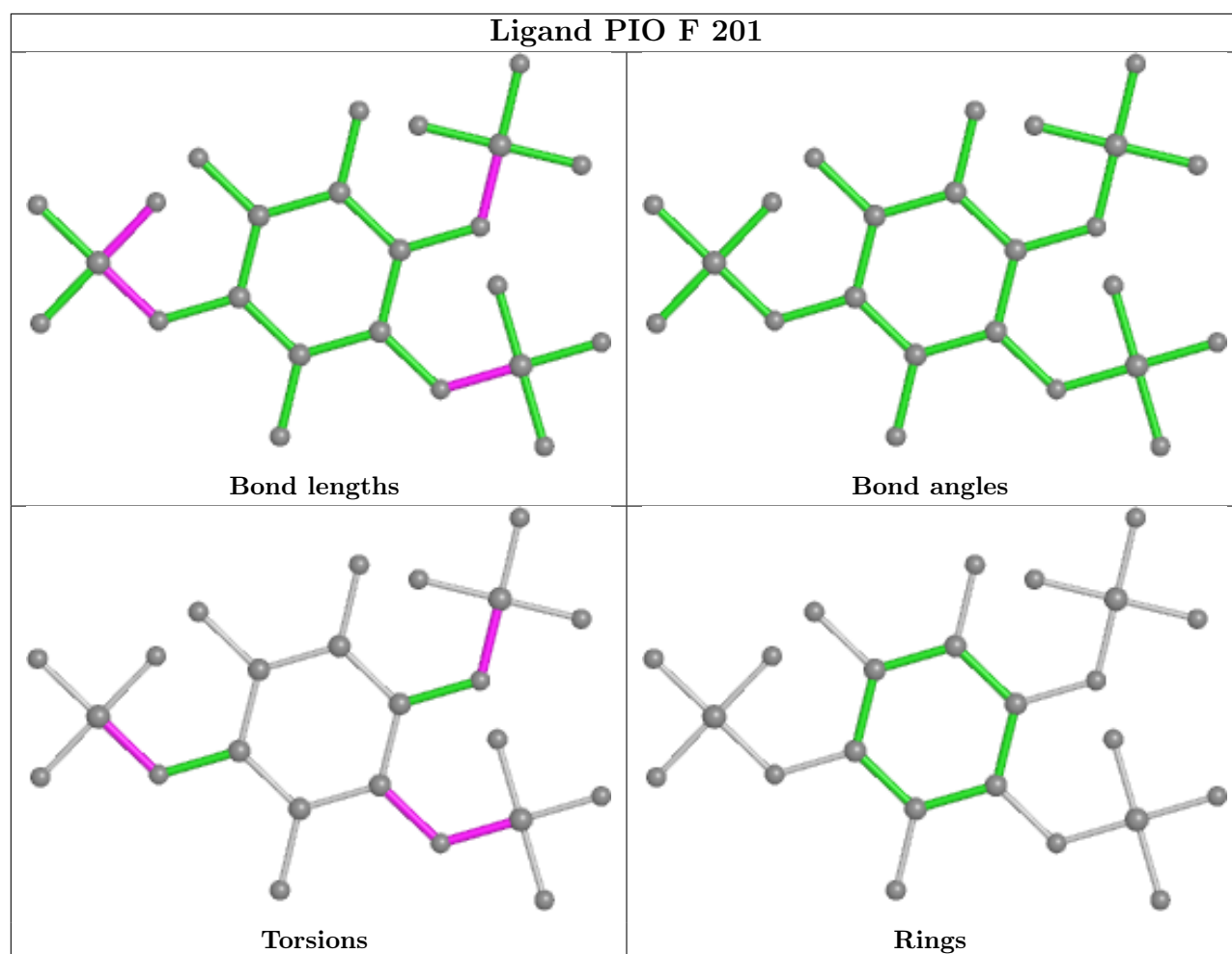




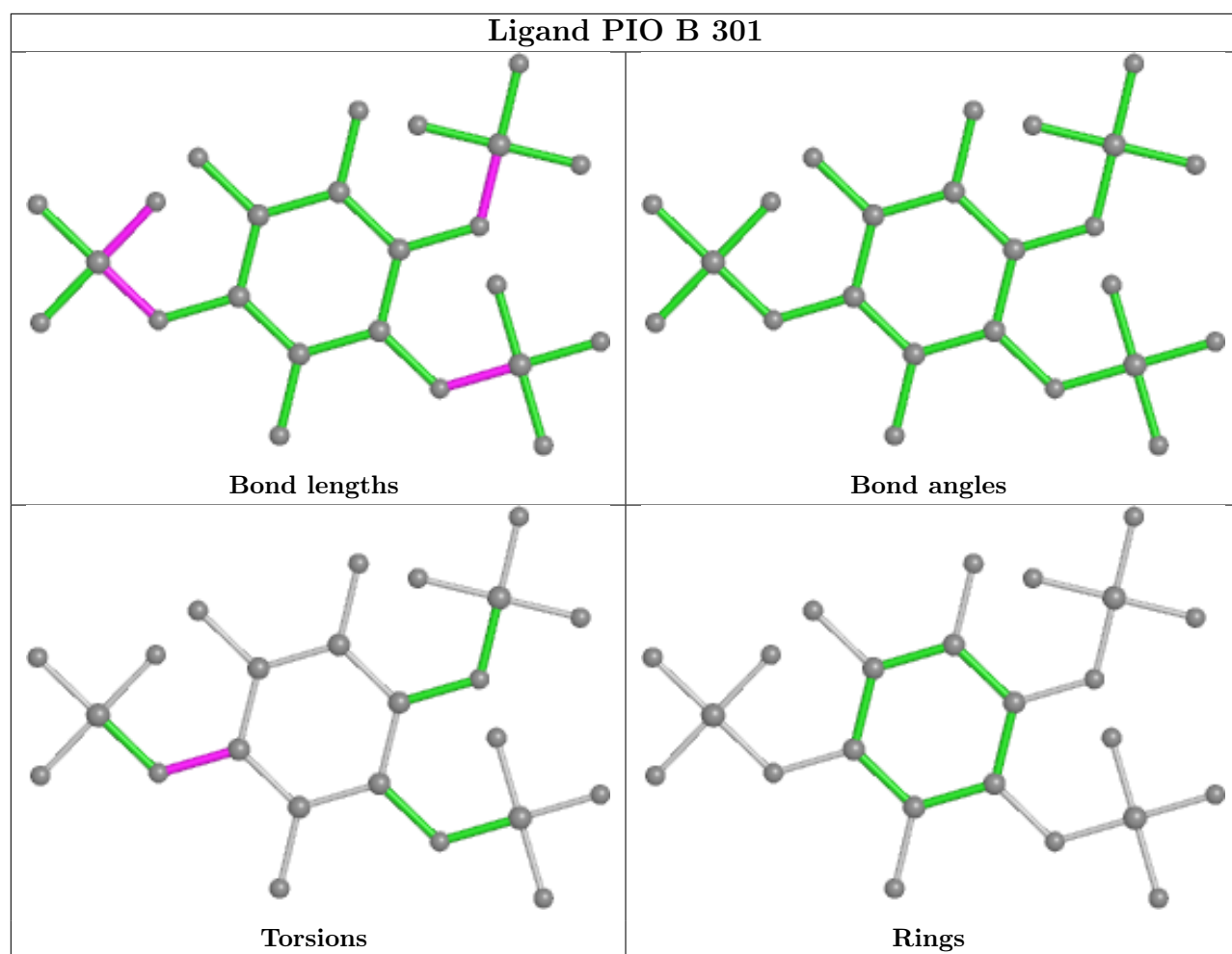


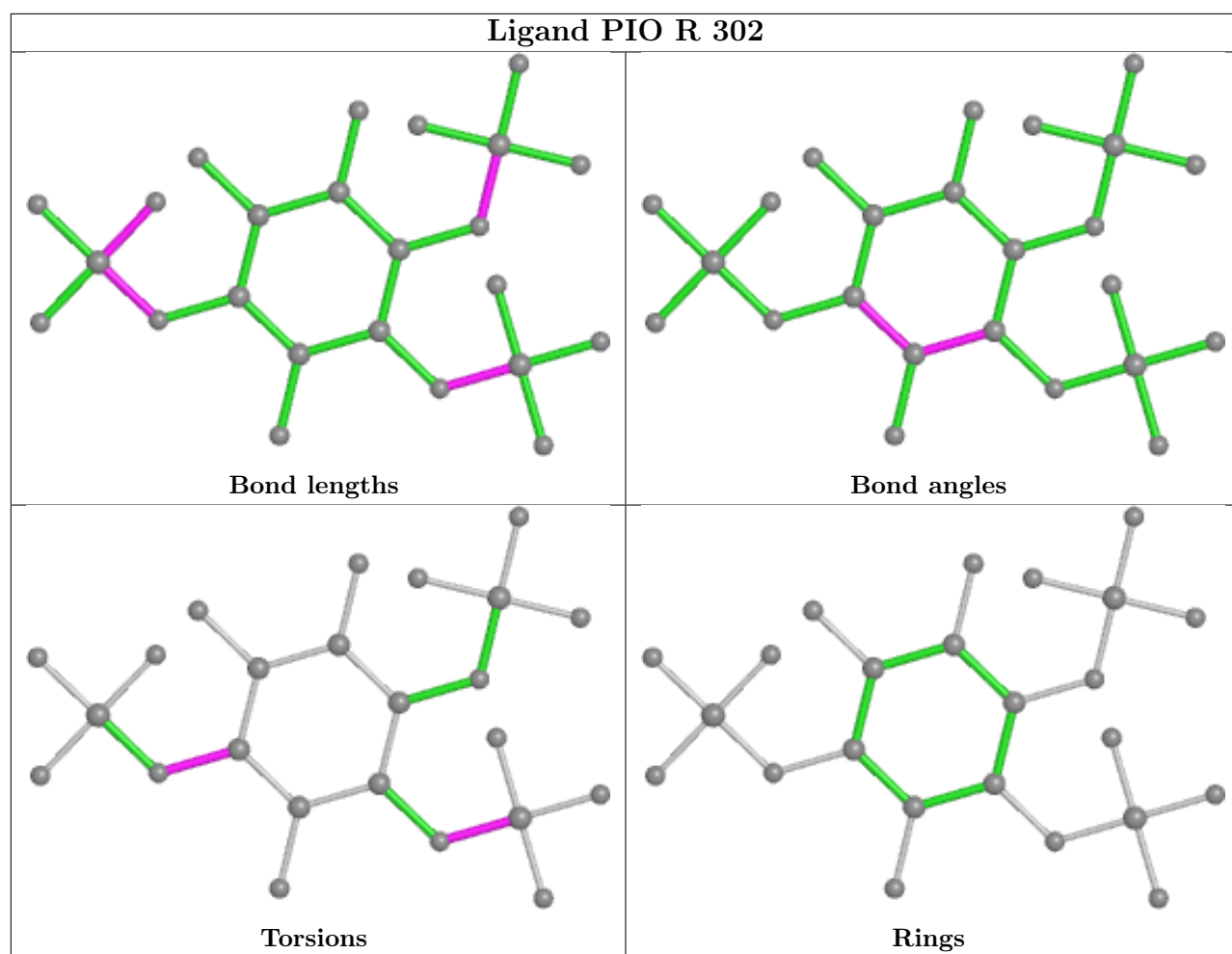


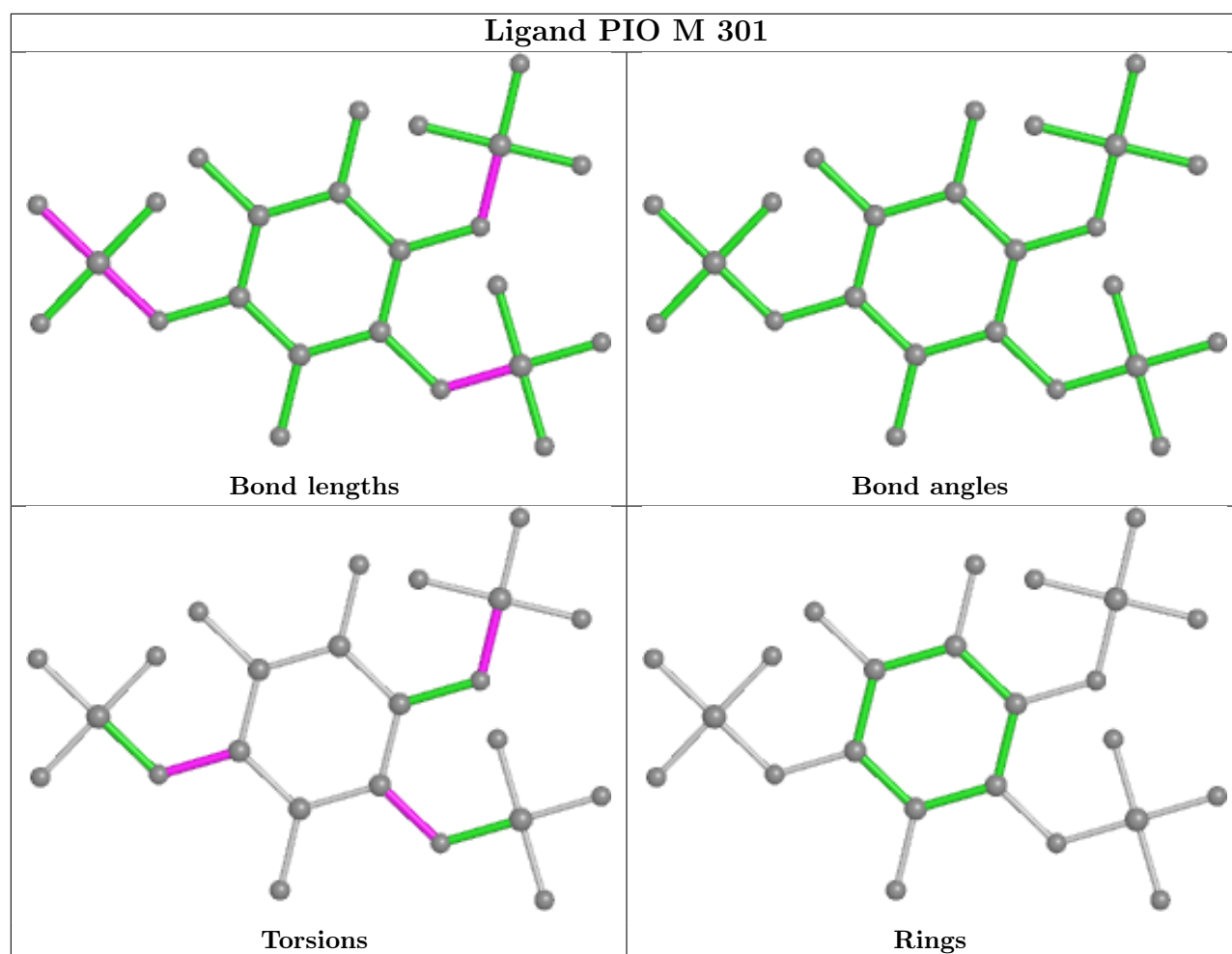


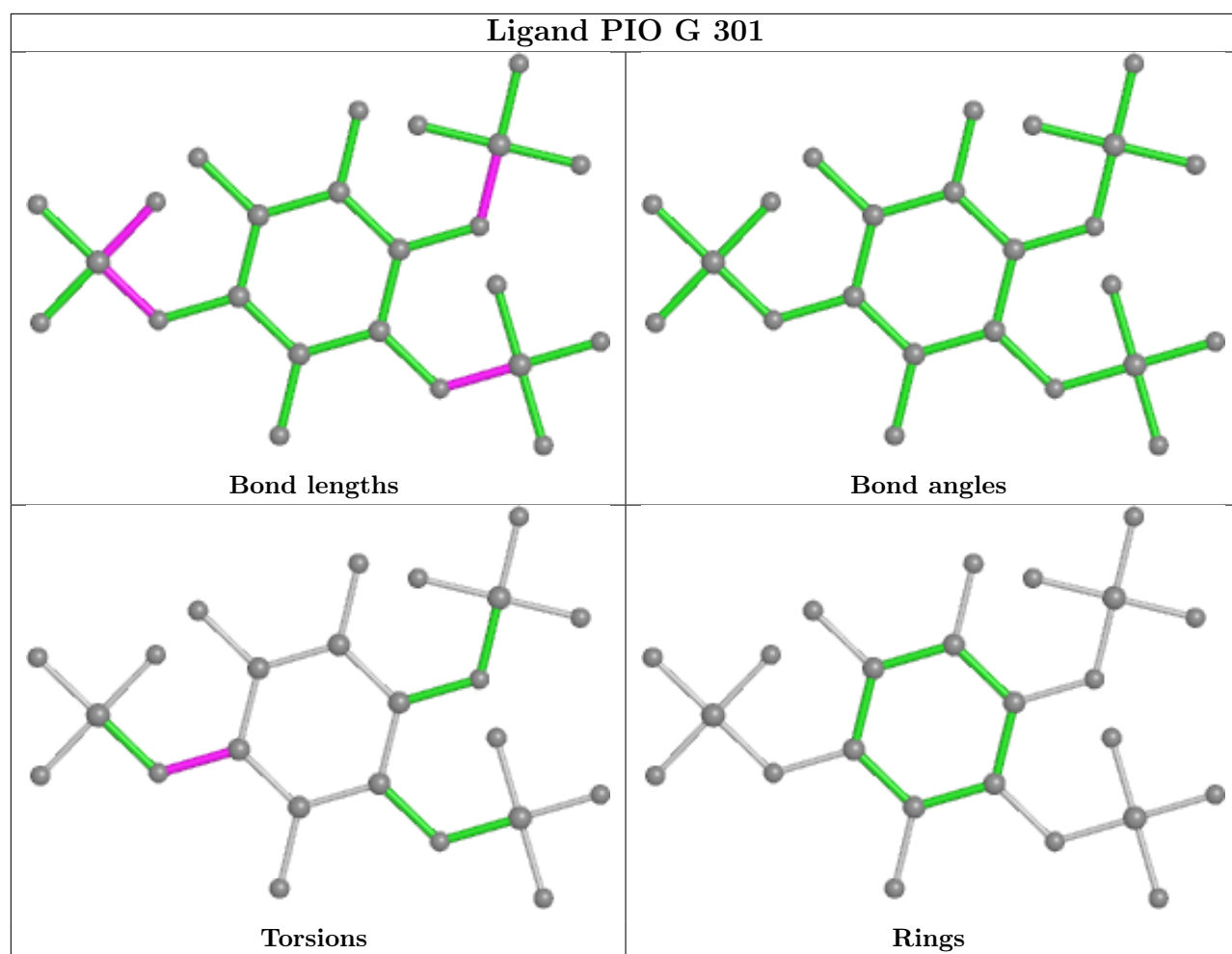


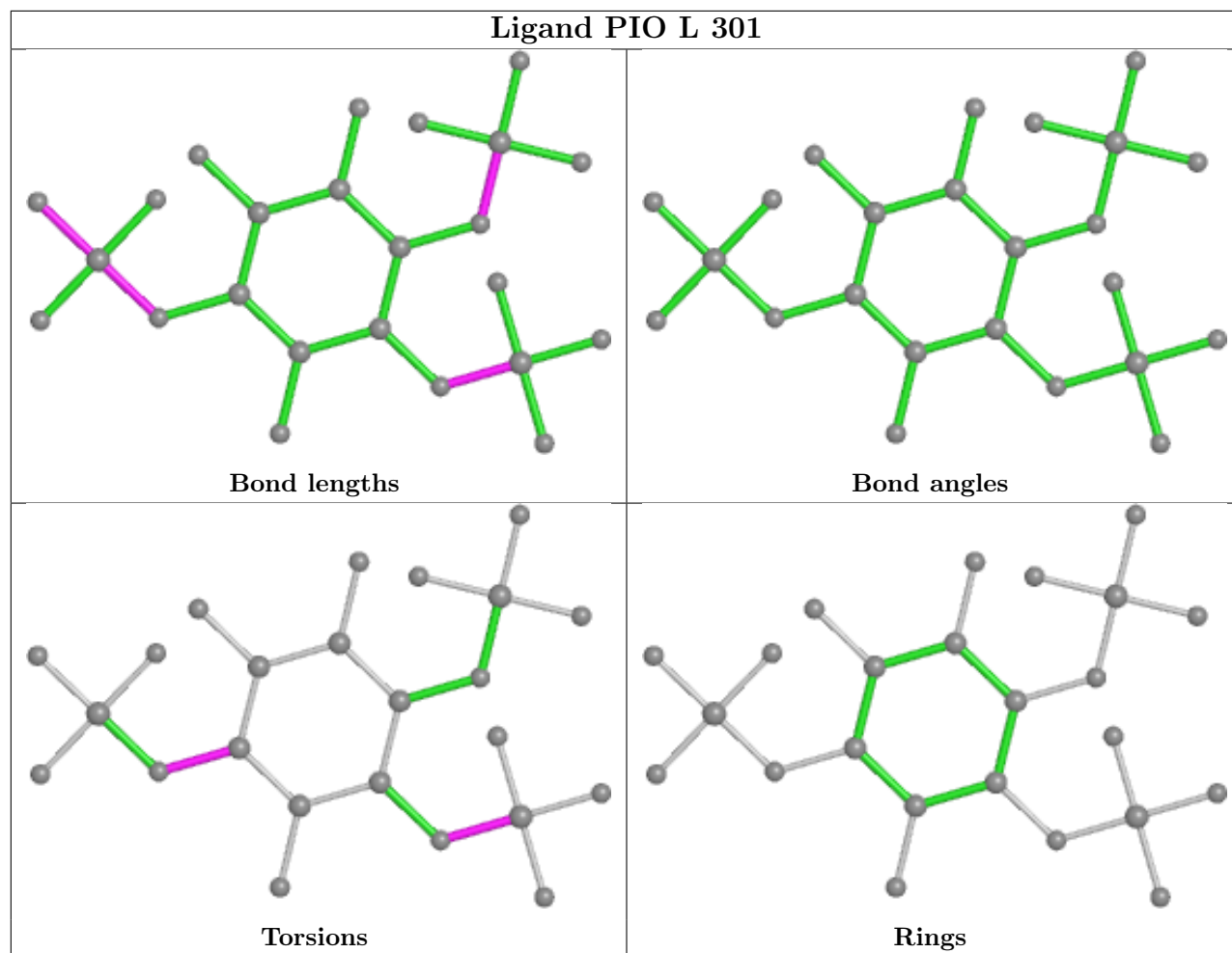


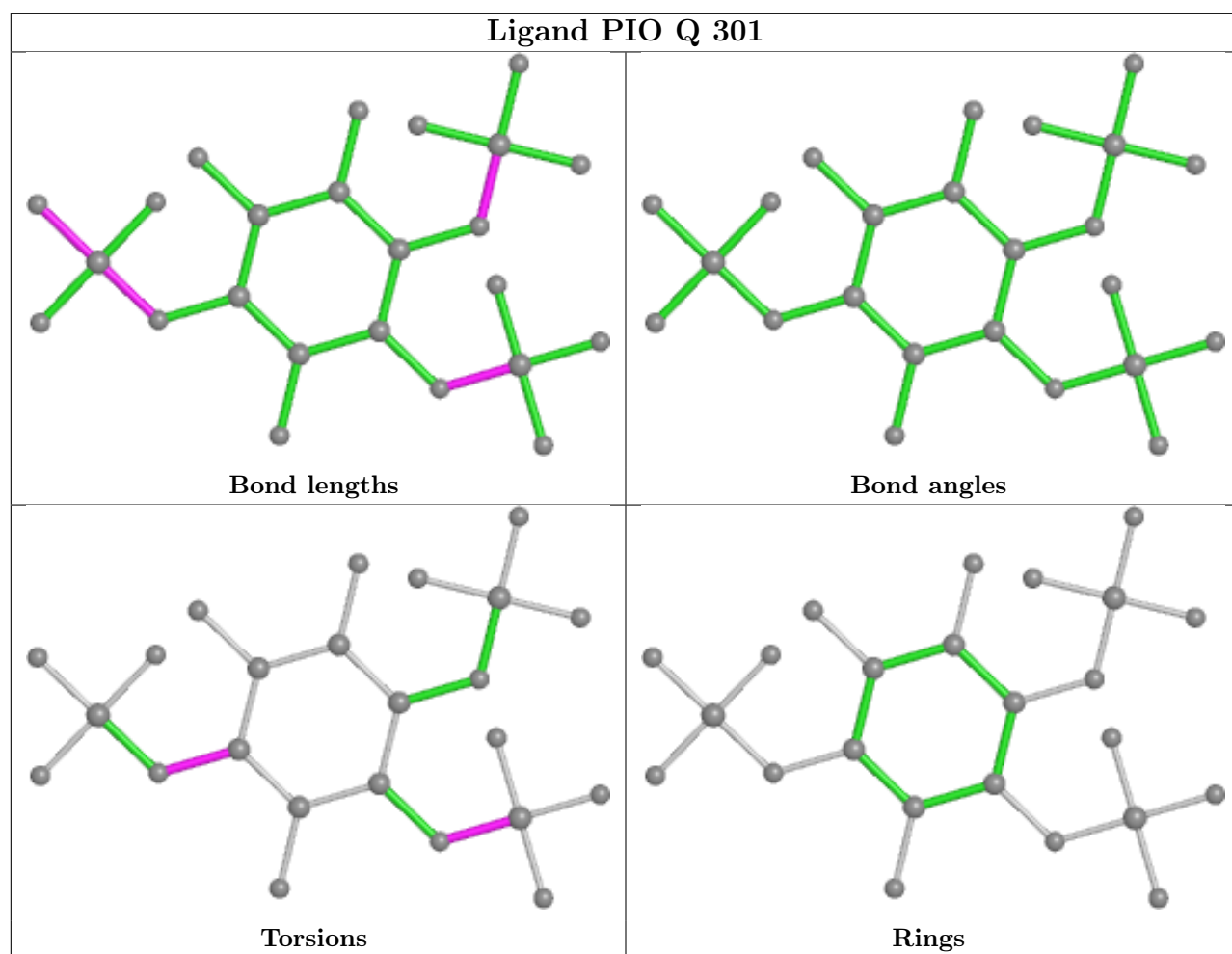


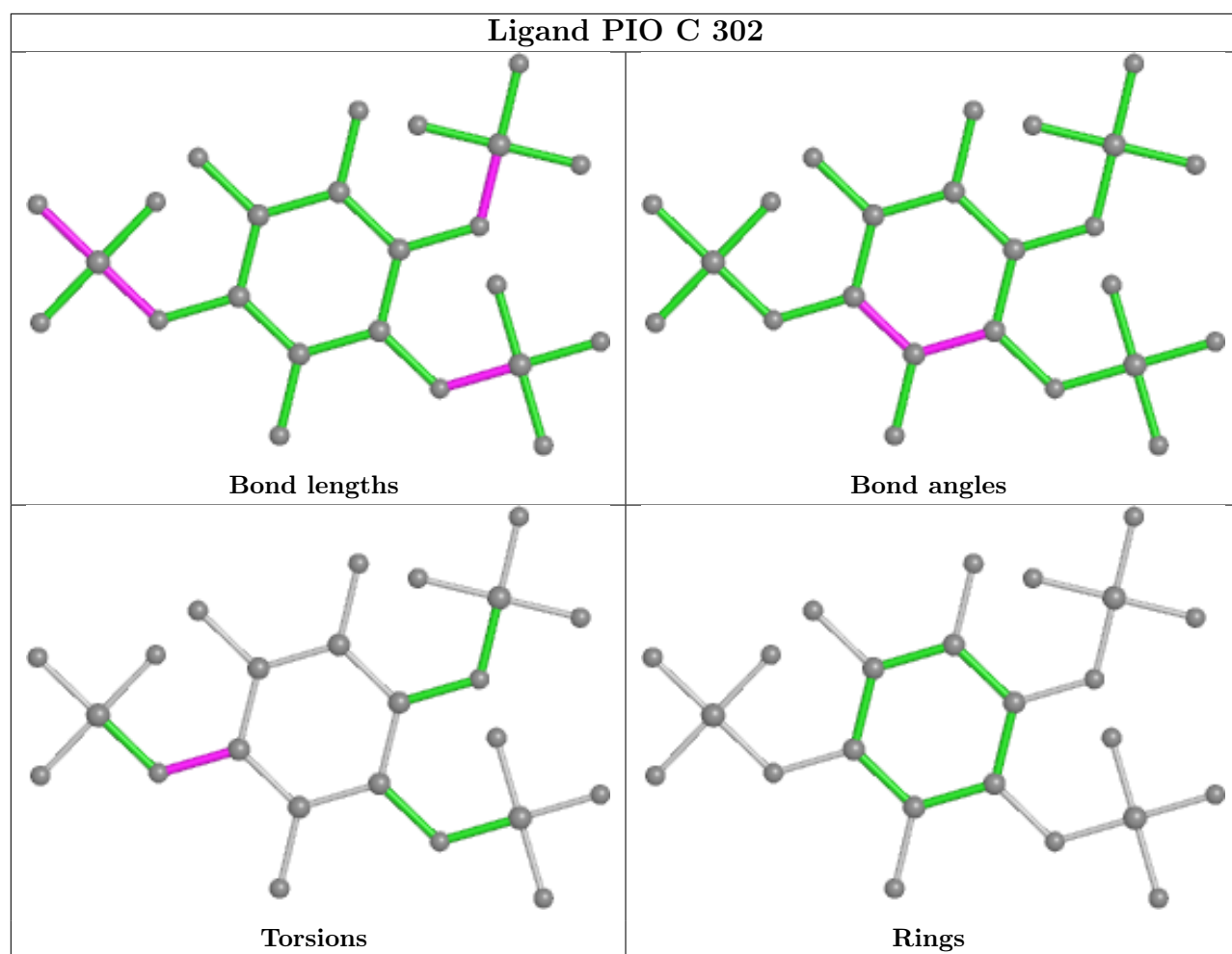


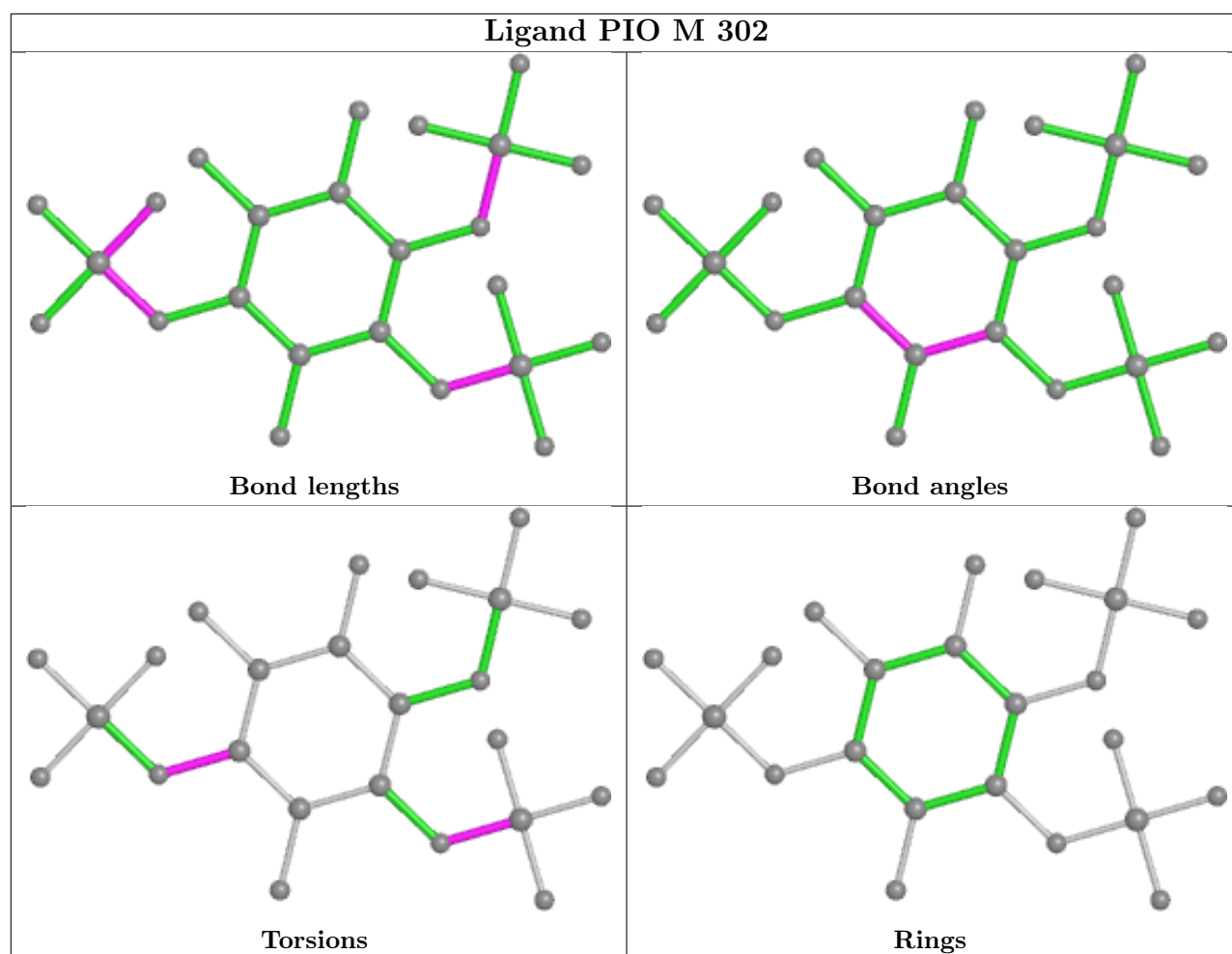




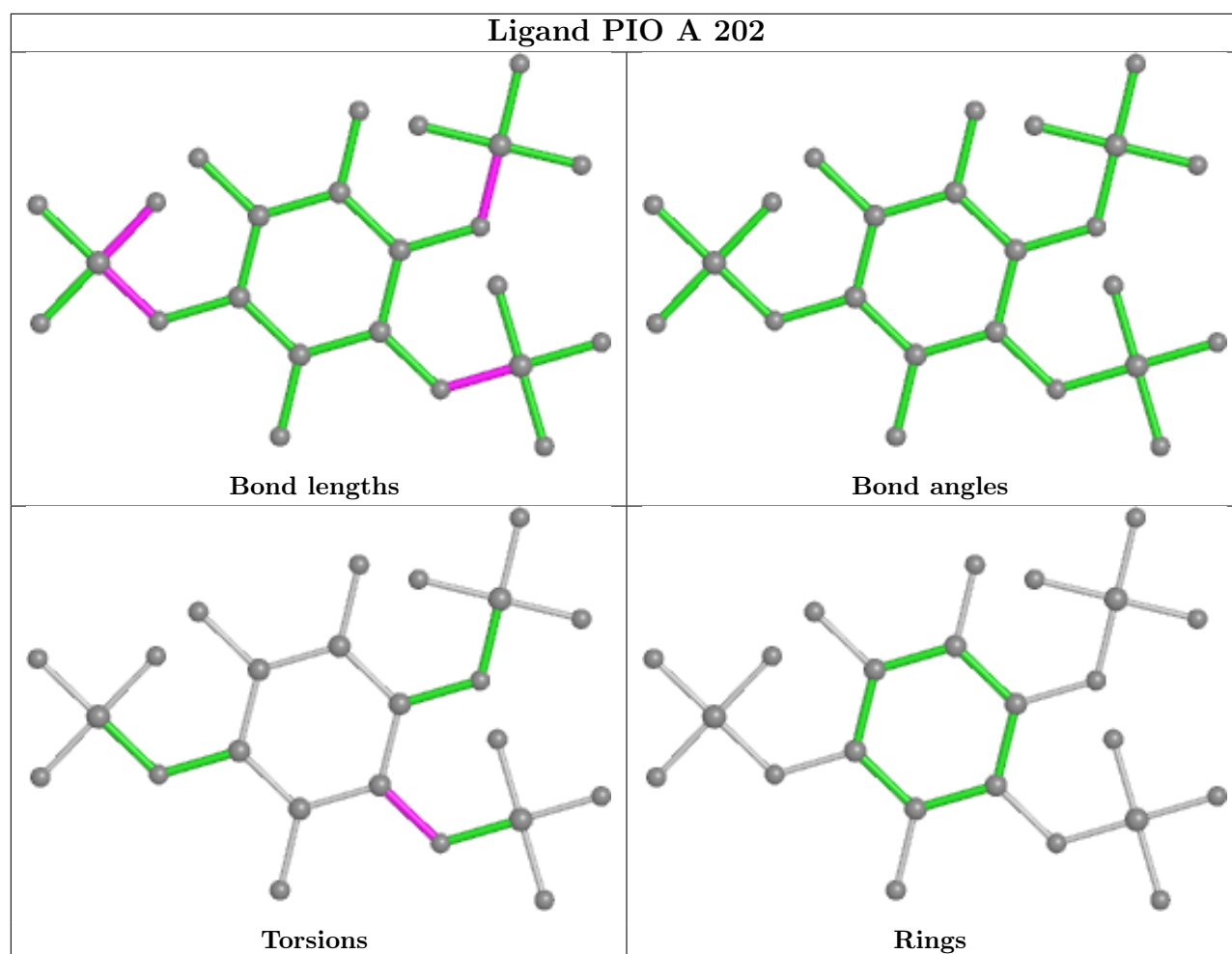


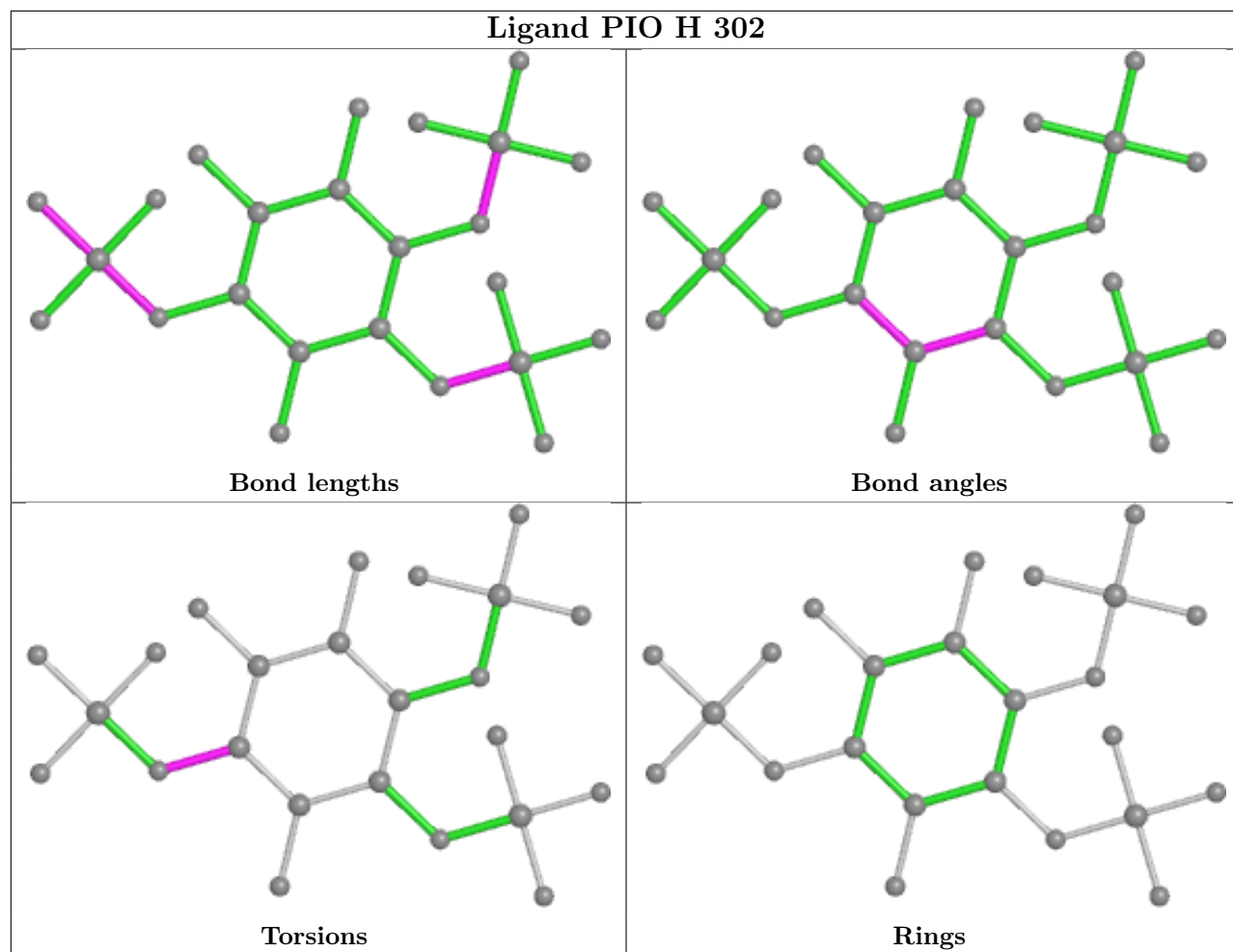


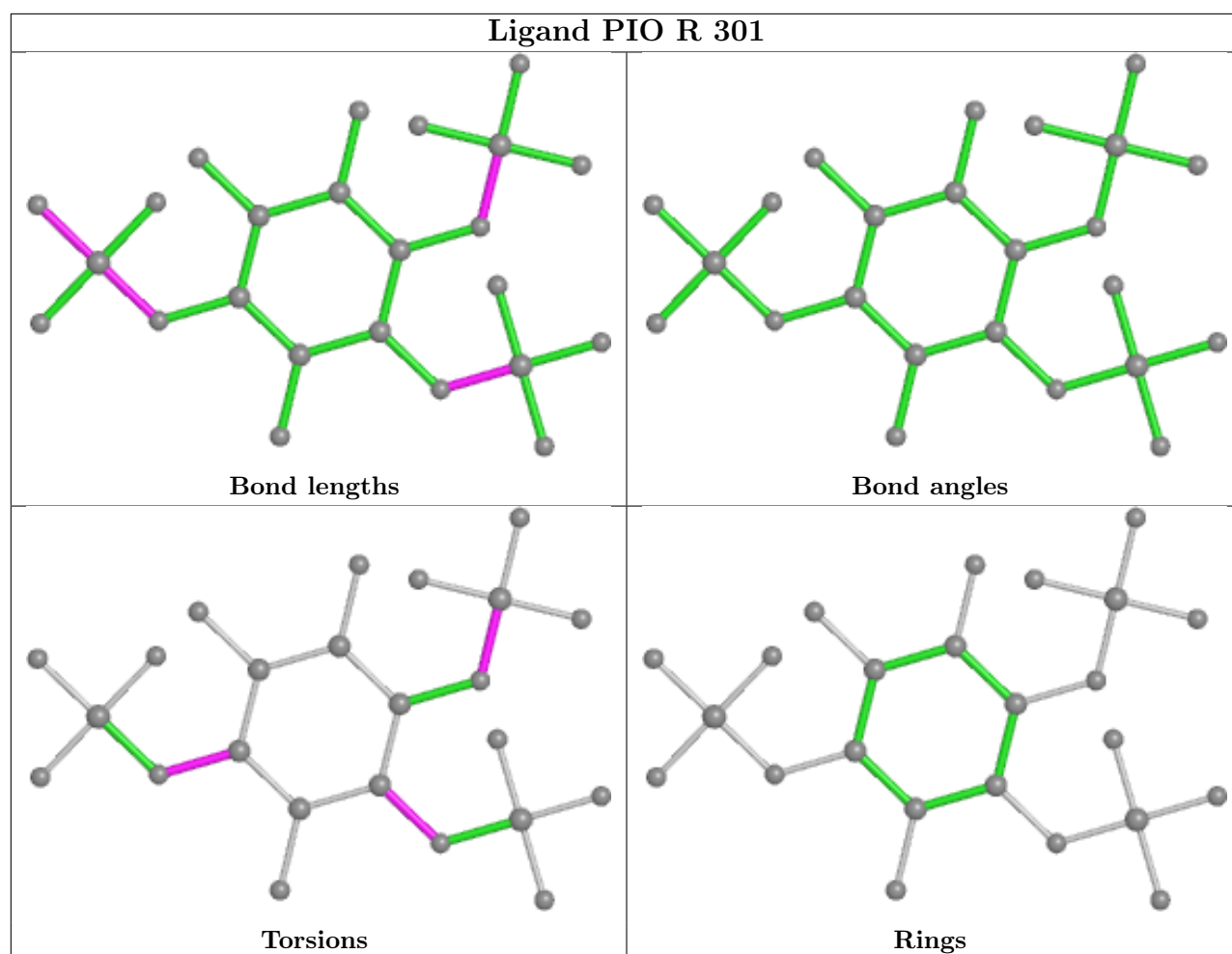












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

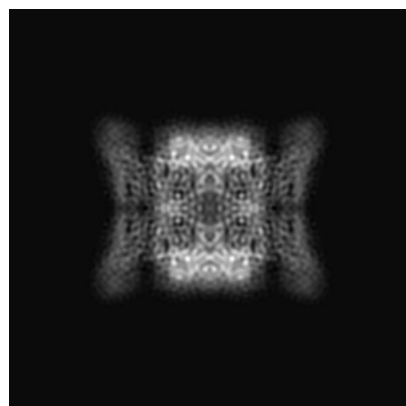
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-11987. These allow visual inspection of the internal detail of the map and identification of artifacts.

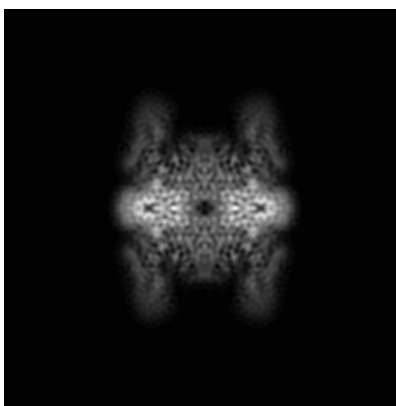
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

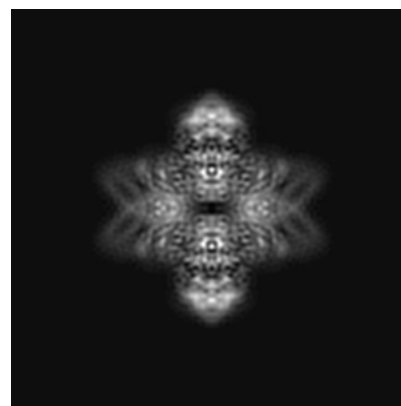
#### 6.1.1 Primary map



X

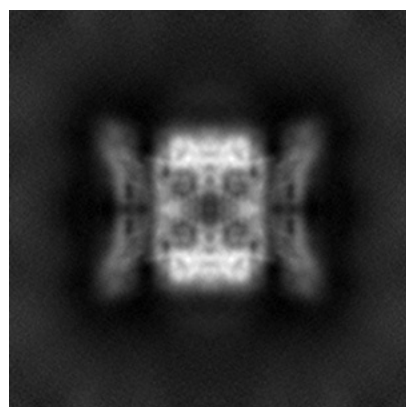


Y

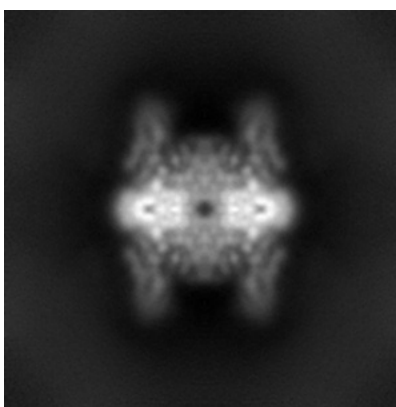


Z

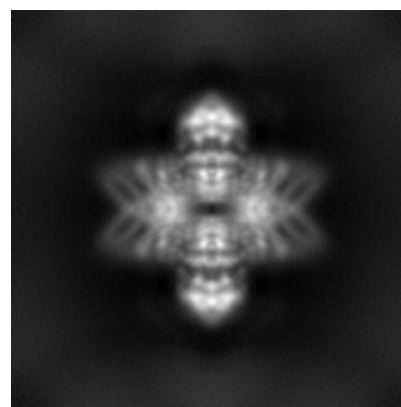
#### 6.1.2 Raw map



X



Y

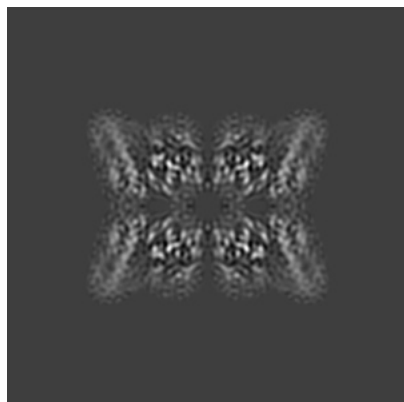


Z

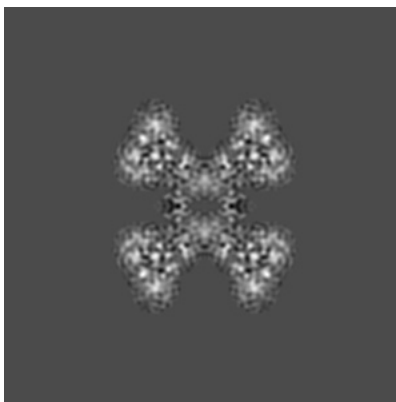
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

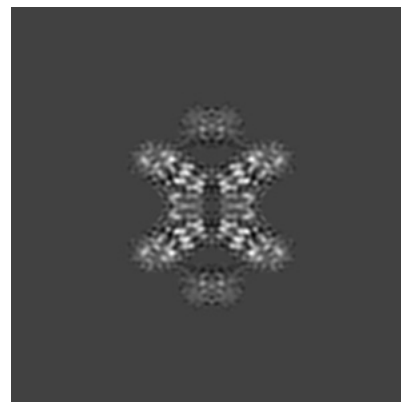
### 6.2.1 Primary map



X Index: 120

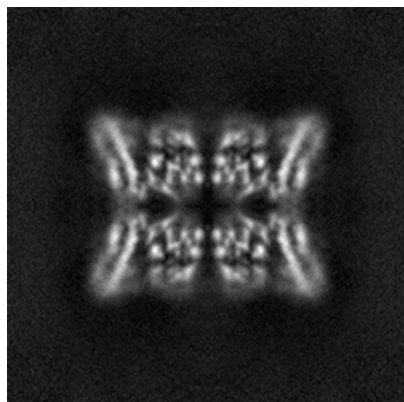


Y Index: 120

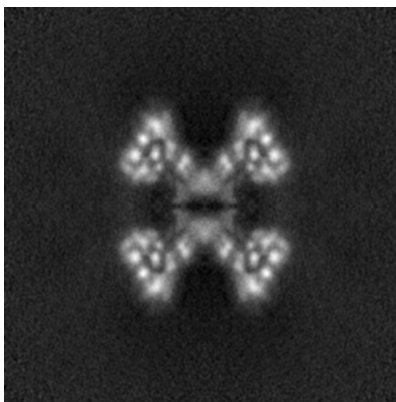


Z Index: 120

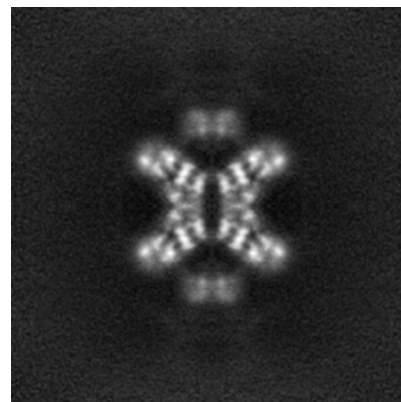
### 6.2.2 Raw map



X Index: 120



Y Index: 120

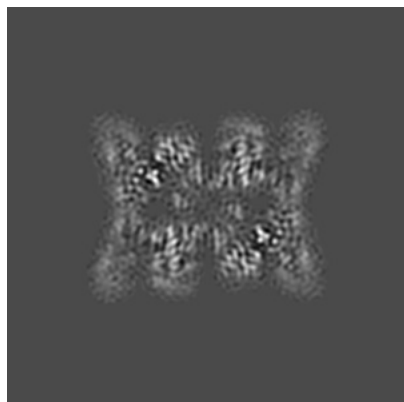


Z Index: 120

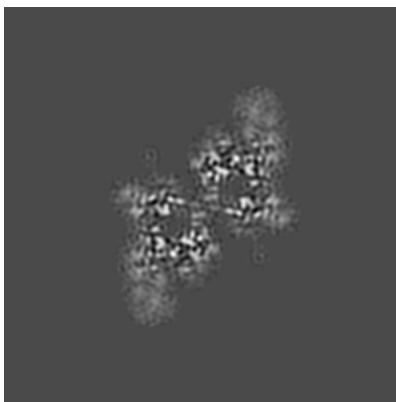
The images above show central slices of the map in three orthogonal directions.

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

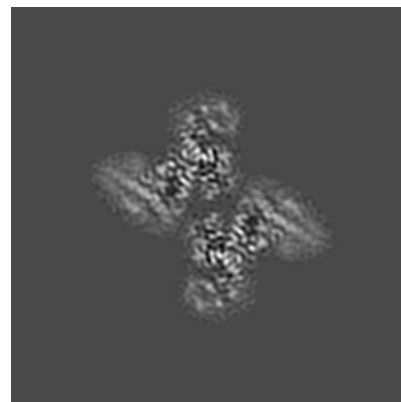
### 6.3.1 Primary map



X Index: 115

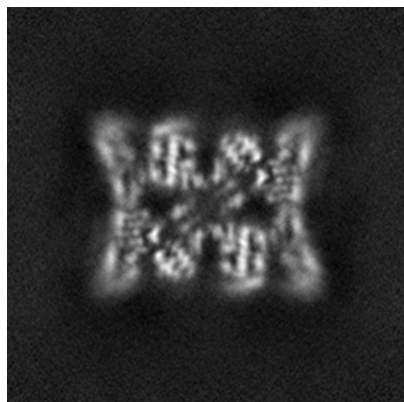


Y Index: 139

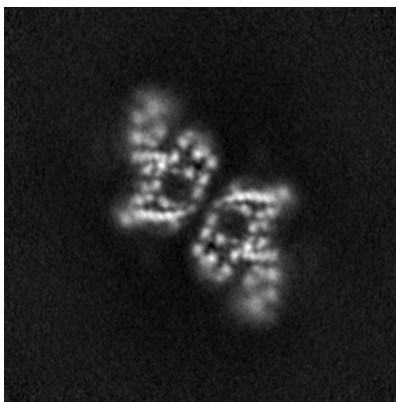


Z Index: 91

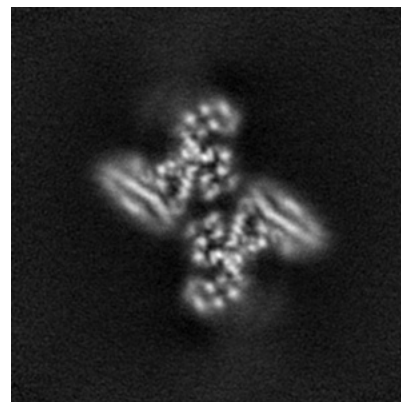
### 6.3.2 Raw map



X Index: 125



Y Index: 99

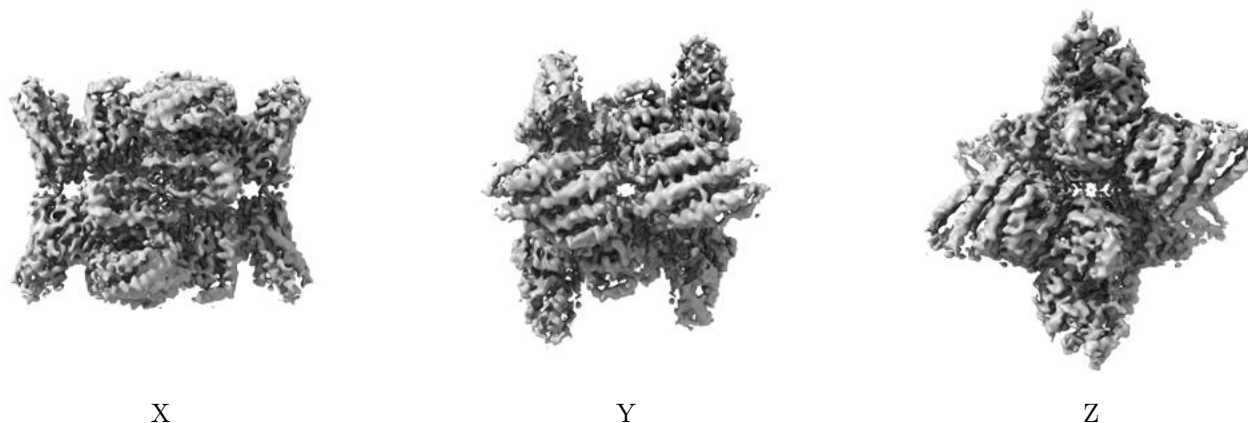


Z Index: 91

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

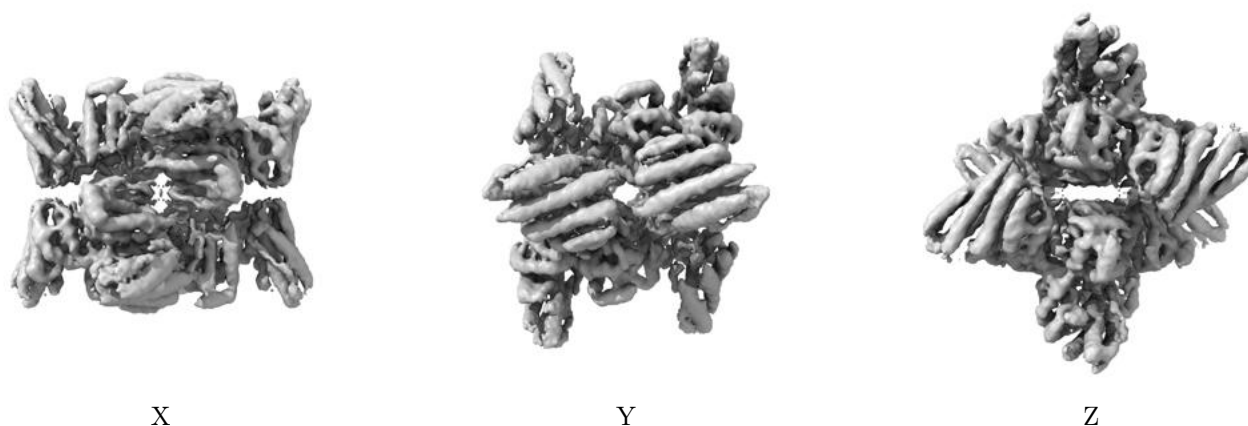
## 6.4 Orthogonal surface views [i](#)

### 6.4.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 1.2. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.4.2 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.

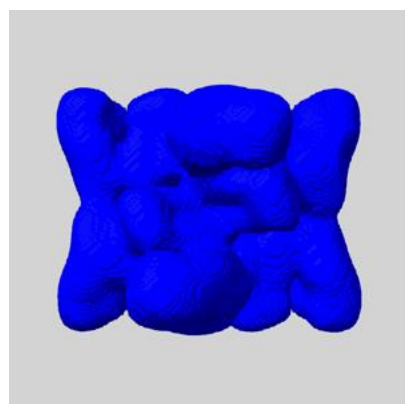
## 6.5 Mask visualisation [i](#)

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

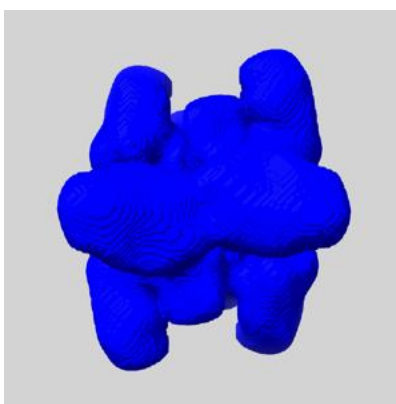
A mask typically either:

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

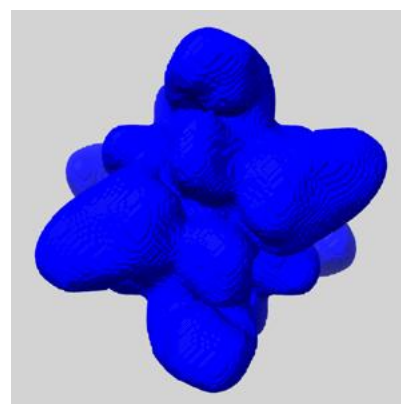
### 6.5.1 emd\_11987\_msk\_1.map [i](#)



X



Y



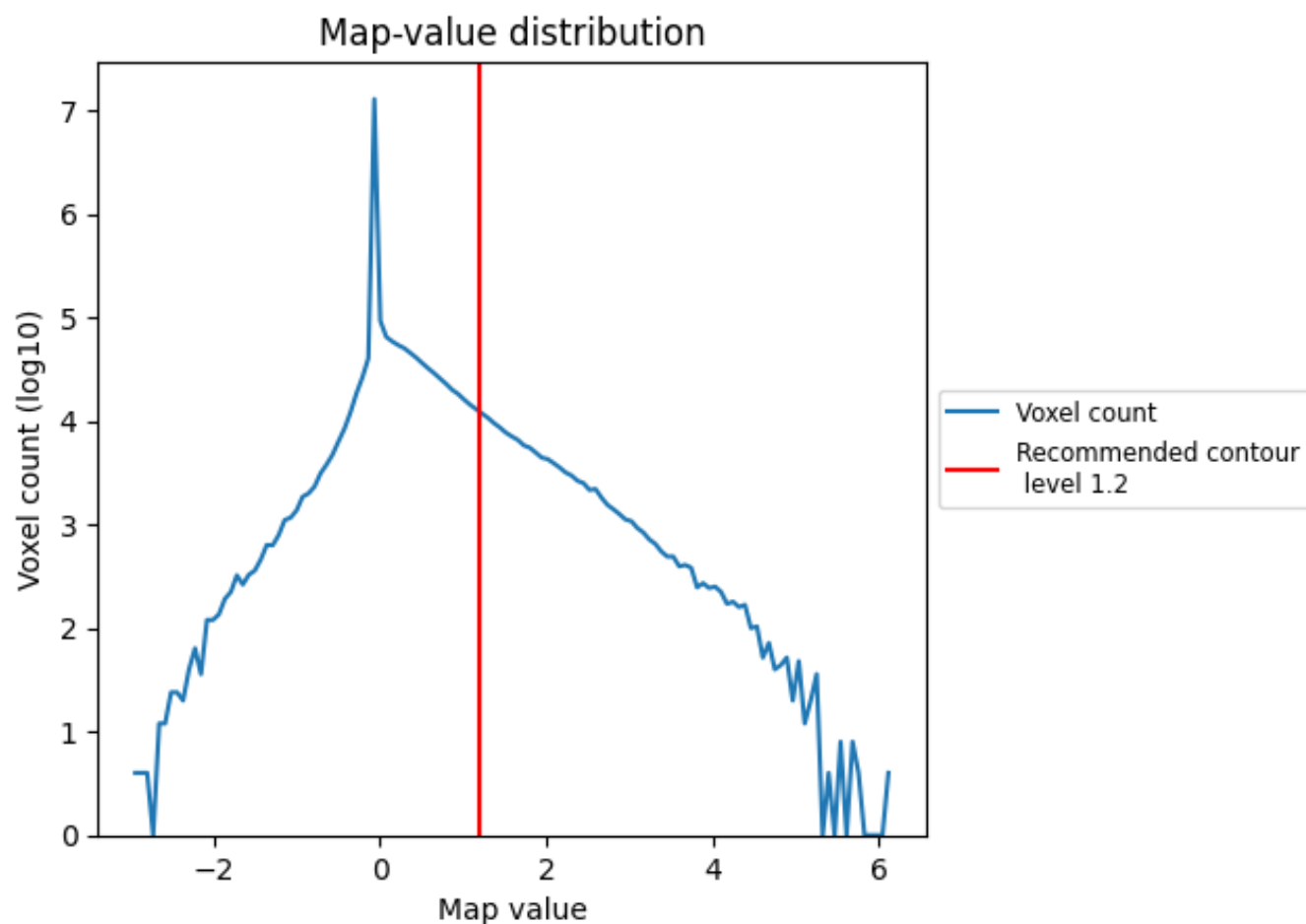
Z



## 7 Map analysis [i](#)

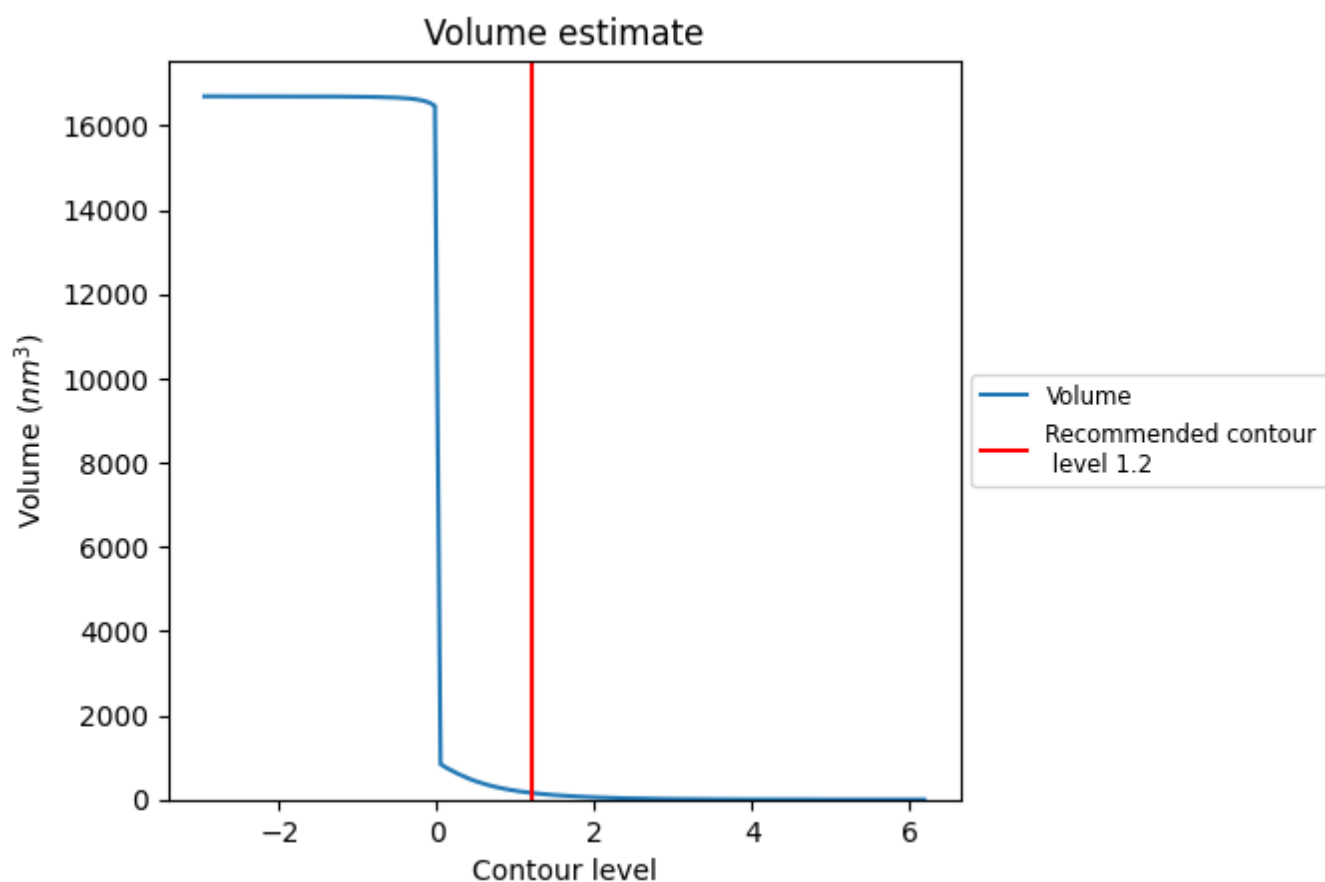
This section contains the results of statistical analysis of the map.

### 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.

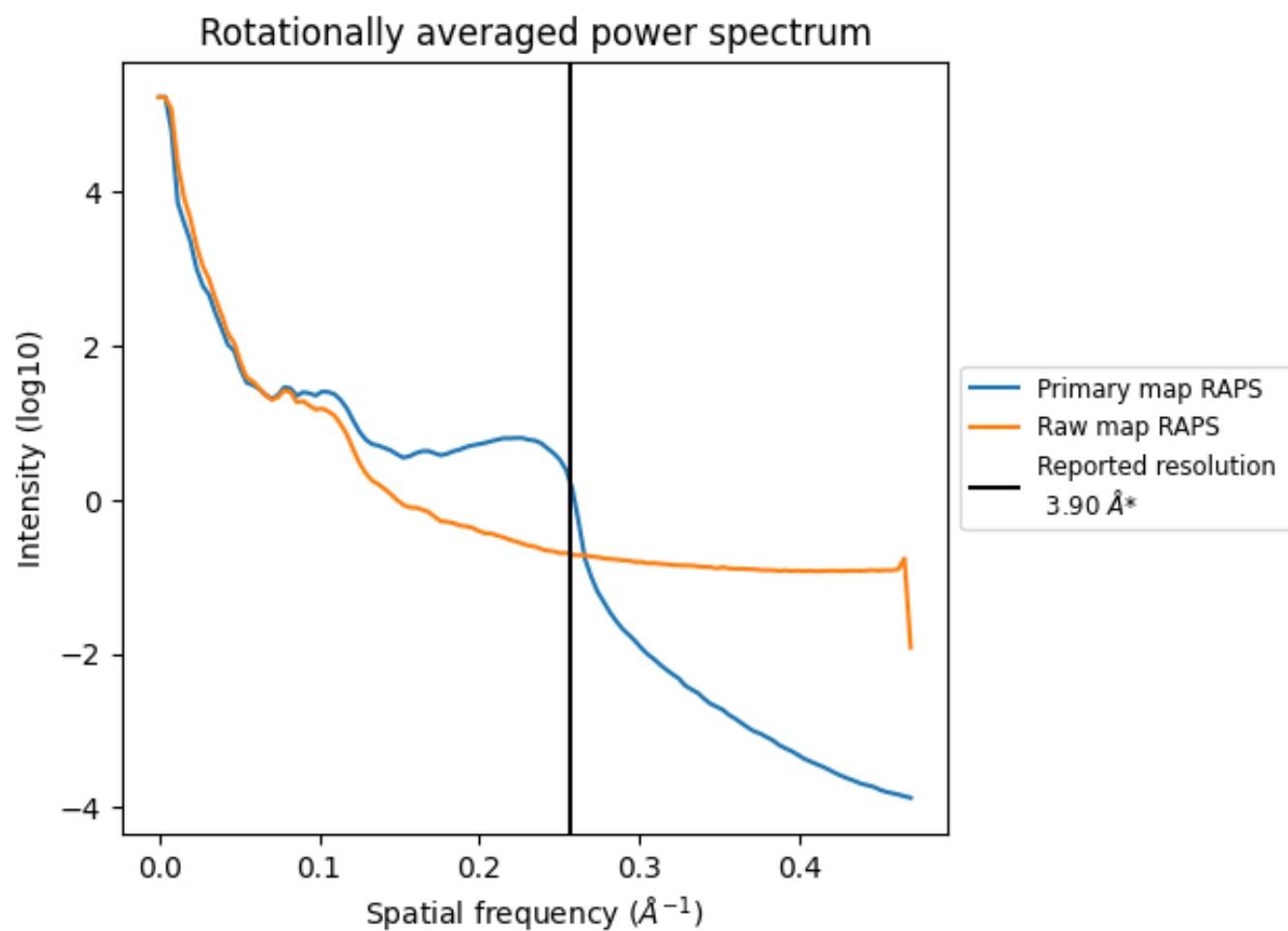
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 159 nm<sup>3</sup>; this corresponds to an approximate mass of 144 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 ⓘ

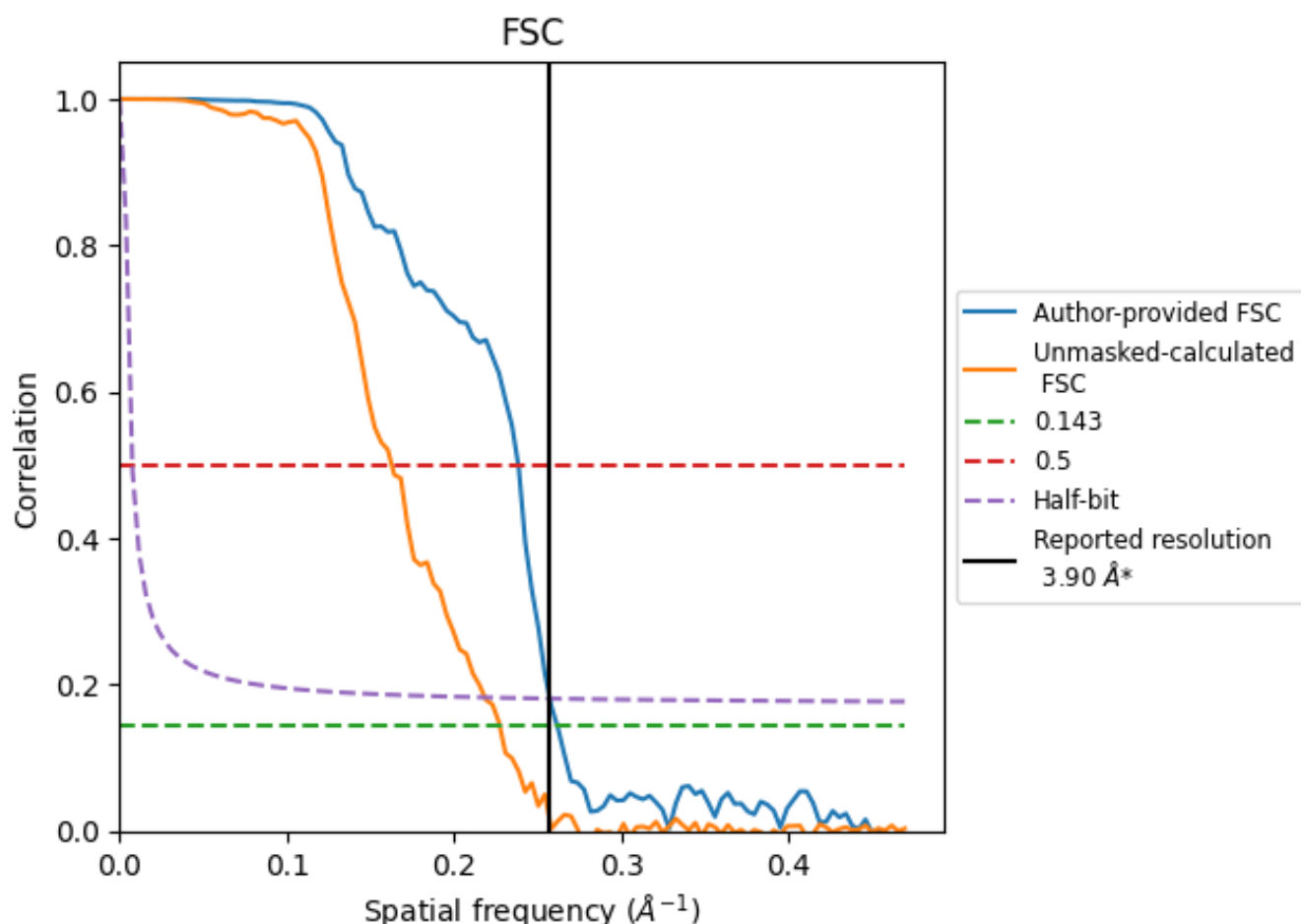


\*Reported resolution corresponds to spatial frequency of 0.256 Å<sup>-1</sup>

## 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 0.256  $\text{\AA}^{-1}$

## 8.2 Resolution estimates [i](#)

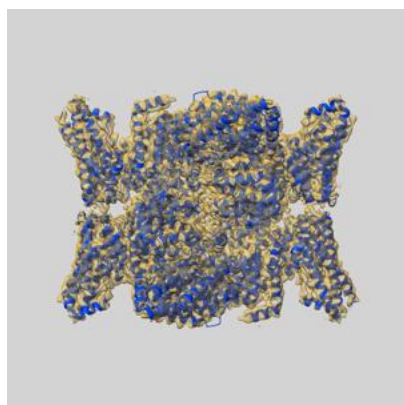
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.90	-	-
Author-provided FSC curve	3.82	4.19	3.89
Unmasked-calculated*	4.40	6.14	4.58

\*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 4.40 differs from the reported value 3.9 by more than 10 %

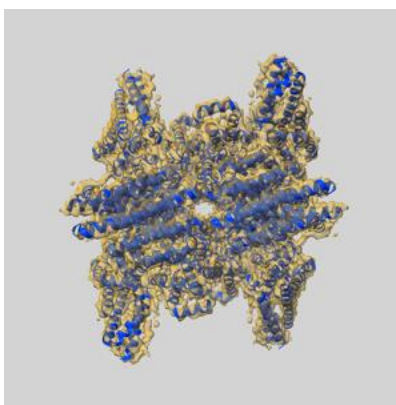
## 9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-11987 and PDB model 7B2L. Per-residue inclusion information can be found in section [3](#) on page [9](#).

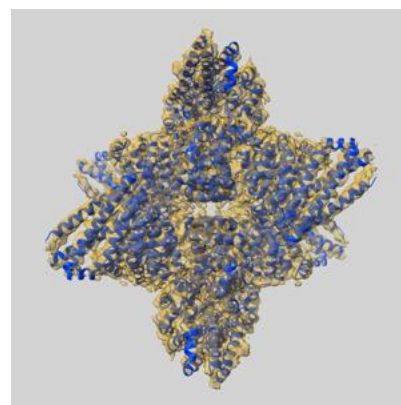
### 9.1 Map-model overlay [i](#)



X



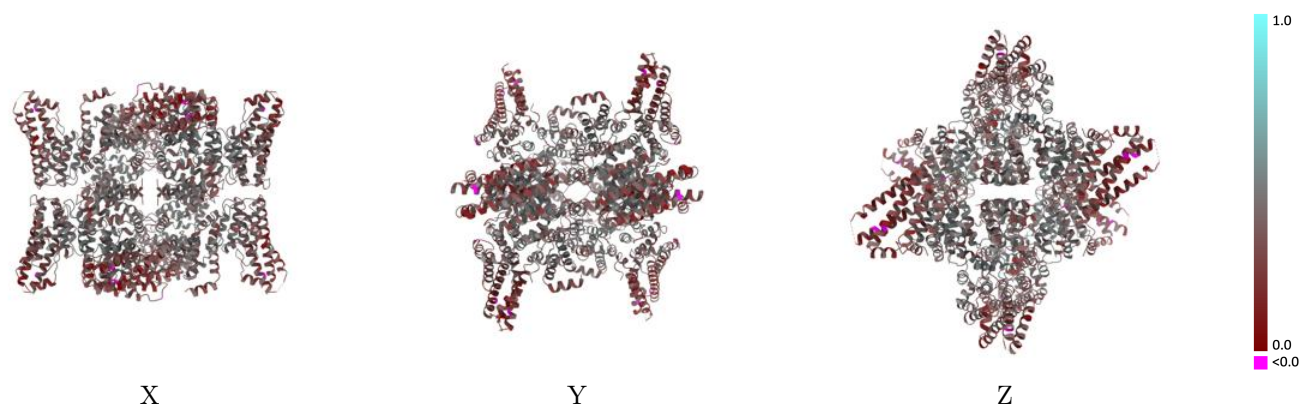
Y



Z

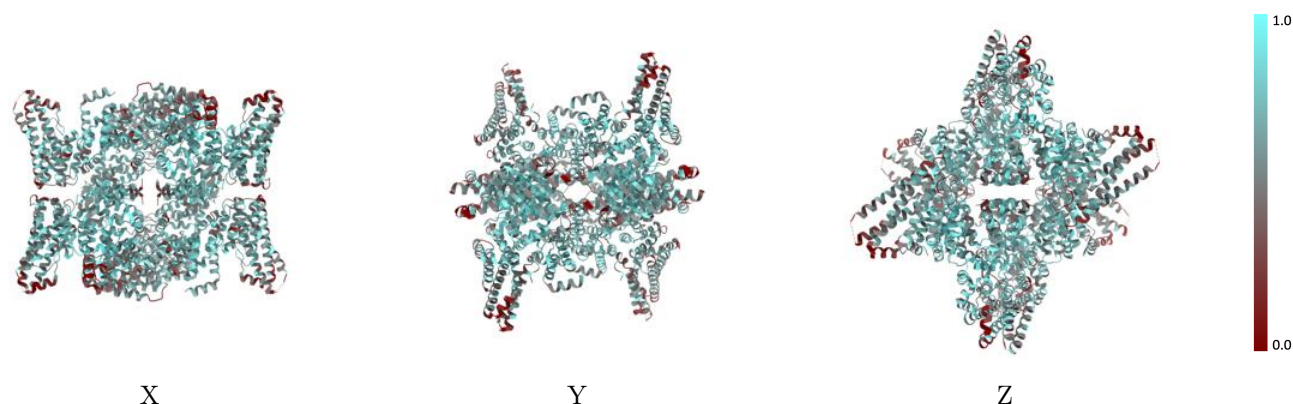
The images above show the 3D surface view of the map at the recommended contour level 1.2 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



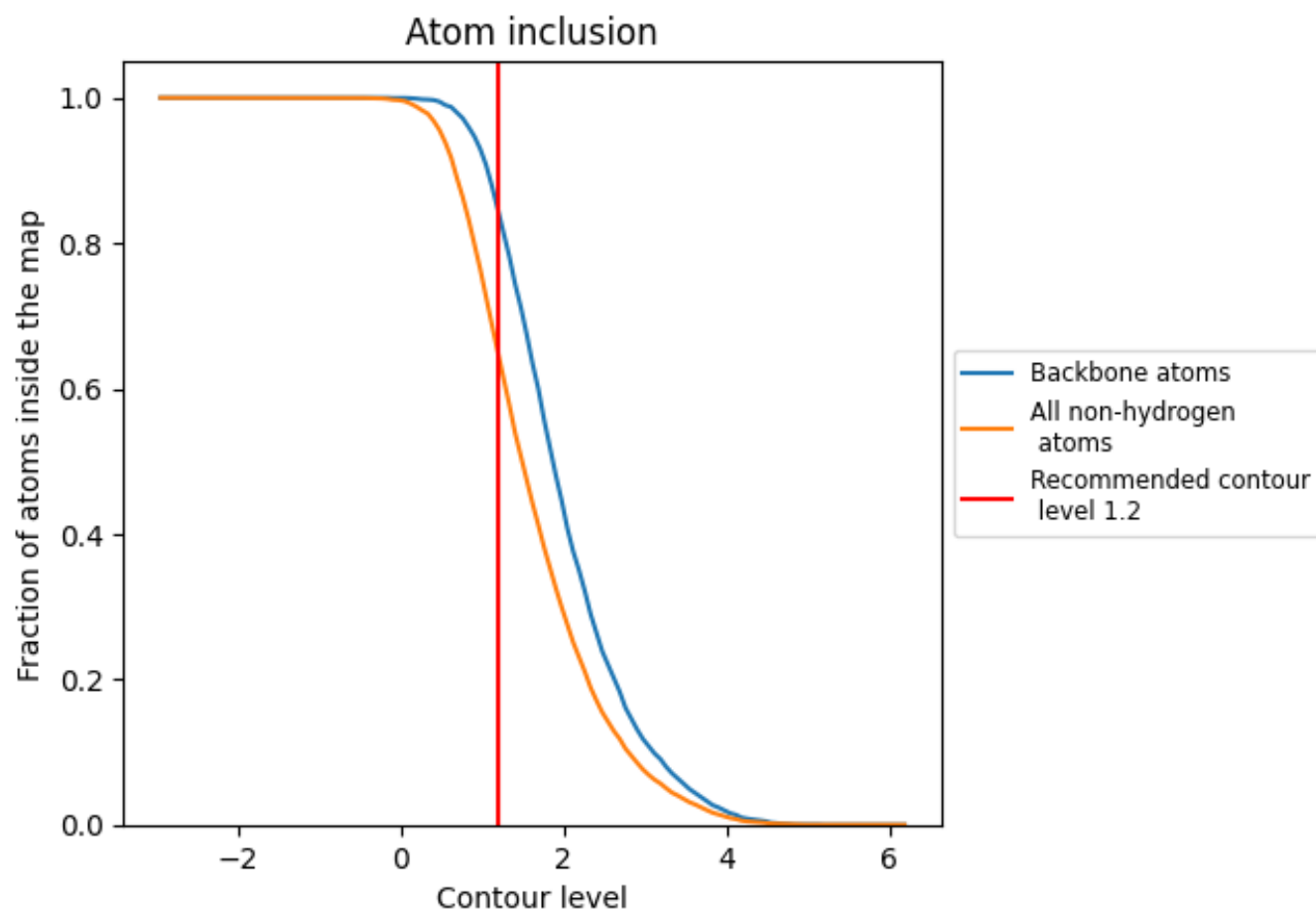
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (1.2).

## 9.4 Atom inclusion ⓘ





































At the recommended contour level, 84% of all backbone atoms, 65% 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 (1.2) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6479	 0.3730
A	 0.7137	 0.4230
B	 0.5833	 0.3300
C	 0.7023	 0.4030
D	 0.6383	 0.3660
F	 0.7137	 0.4220
G	 0.5833	 0.3310
H	 0.7023	 0.4060
I	 0.6383	 0.3650
K	 0.7137	 0.4220
L	 0.5833	 0.3320
M	 0.7023	 0.4050
N	 0.6383	 0.3660
P	 0.7137	 0.4240
Q	 0.5833	 0.3320
R	 0.7023	 0.4030
S	 0.6383	 0.3670

