



Full wwPDB EM Validation Report ⓘ

Sep 24, 2025 – 03:34 pm BST

PDB ID : 8A5E / pdb_00008a5e
EMDB ID : EMD-15166
Title : Cryo-EM structure of the electron bifurcating Fe-Fe hydrogenase HydABC complex from *Acetobacterium woodii* in the reduced state
Authors : Kumar, A.; Saura, P.; Gamiz-Hernandez, A.P.; Kaila, V.R.I.; Mueller, V.; Schuller, J.M.
Deposited on : 2022-06-14
Resolution : 3.40 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.dev129
Mogul : 1.8.4, CSD as541be (2020)
MolProbity : 4-5-2 with Phenix2.0
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
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) : 2.46

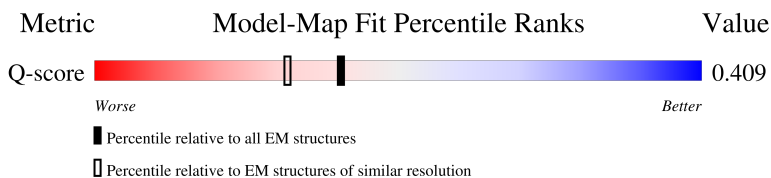
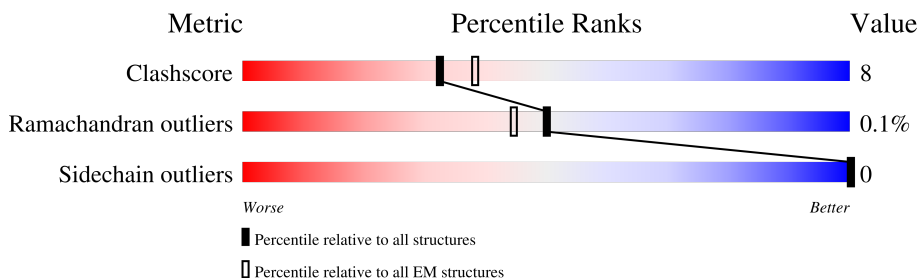
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.40 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	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	14717 (2.90 - 3.90)

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	583	 80% 20%
1	D	583	 84% 16%
2	B	599	 8% 61% 14% 25%
3	C	156	 8% 81% 19%

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
5	FES	A	604	-	-	X	-
5	FES	C	201	-	-	X	-
6	HC1	D	606	-	-	X	-

2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 13611 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 Iron hydrogenase HydA1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	583	Total	C	N	O	S	0	0
			4442	2774	766	865	37		
1	D	583	Total	C	N	O	S	0	0
			4442	2774	766	865	37		

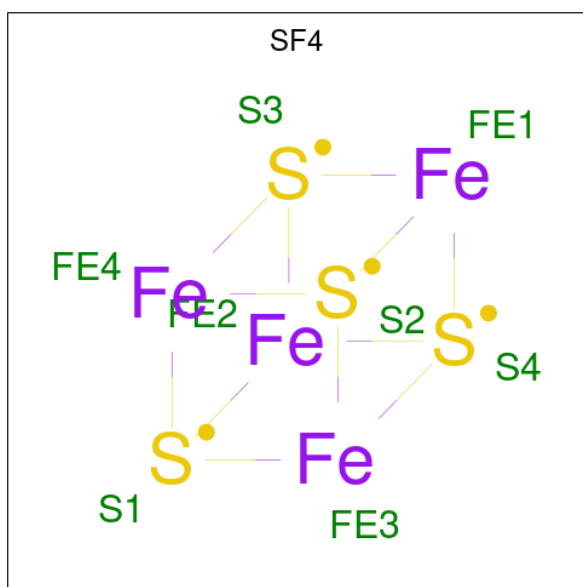
- Molecule 2 is a protein called Iron hydrogenase HydB.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	447	Total	C	N	O	S	0	0
			3331	2096	567	640	28		

- Molecule 3 is a protein called Iron hydrogenase HydC.

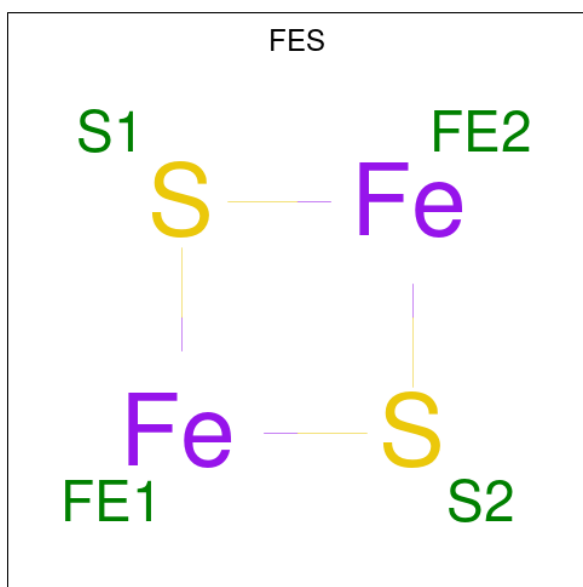
Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	156	Total	C	N	O	S	0	0
			1188	761	190	228	9		

- Molecule 4 is IRON/SULFUR CLUSTER (CCD ID: SF4) (formula: Fe₄S₄) (labeled as "Ligand of Interest" by depositor).



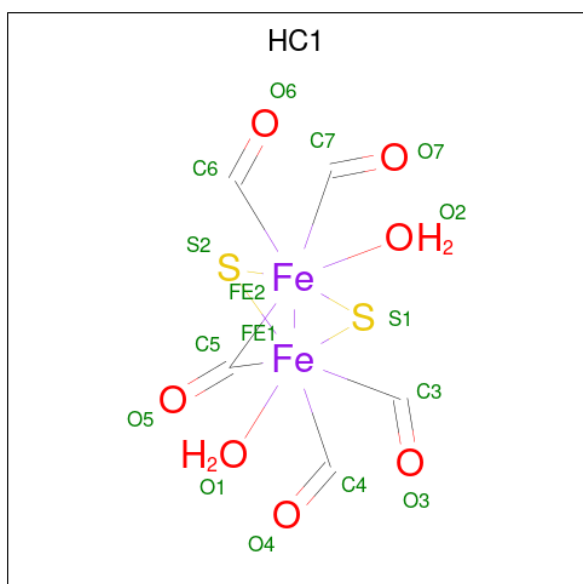
Mol	Chain	Residues	Atoms			AltConf
4	A	1	Total	Fe	S	0
			8	4	4	
4	A	1	Total	Fe	S	0
			8	4	4	
4	A	1	Total	Fe	S	0
			8	4	4	
4	A	1	Total	Fe	S	0
			8	4	4	
4	B	1	Total	Fe	S	0
			8	4	4	
4	B	1	Total	Fe	S	0
			8	4	4	
4	B	1	Total	Fe	S	0
			8	4	4	
4	D	1	Total	Fe	S	0
			8	4	4	
4	D	1	Total	Fe	S	0
			8	4	4	
4	D	1	Total	Fe	S	0
			8	4	4	

- Molecule 5 is FE2/S2 (INORGANIC) CLUSTER (CCD ID: FES) (formula: Fe_2S_2) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			AltConf
5	A	1	Total	Fe	S	0
			4	2	2	
5	C	1	Total	Fe	S	0
			4	2	2	
5	D	1	Total	Fe	S	0
			4	2	2	

- Molecule 6 is 2 IRON/2 SULFUR/5 CARBONYL/2 WATER INORGANIC CLUSTER (CCD ID: HC1) (formula: $C_5H_8Fe_2O_7S_2$) (labeled as "Ligand of Interest" by depositor).

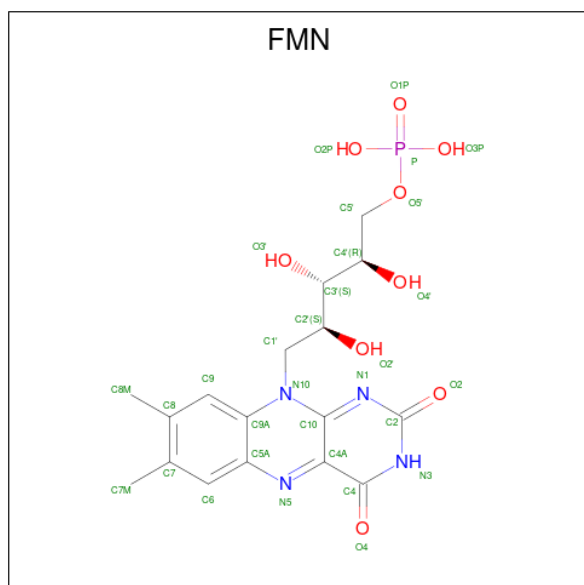


Mol	Chain	Residues	Atoms					AltConf
6	A	1	Total	C	Fe	O	S	0
			16	5	2	7	2	
6	D	1	Total	C	Fe	O	S	0
			16	5	2	7	2	

- Molecule 7 is ZINC ION (CCD ID: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

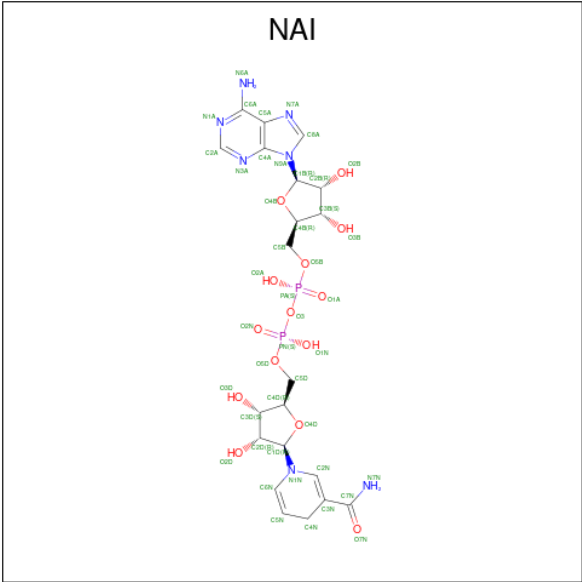
Mol	Chain	Residues	Atoms		AltConf
7	B	1	Total	Zn	0
			1	1	

- Molecule 8 is FLAVIN MONONUCLEOTIDE (CCD ID: FMN) (formula: C₁₇H₂₁N₄O₉P) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
8	B	1	Total	C	N	O	P	0
			31	17	4	9	1	

- Molecule 9 is 1,4-DIHYDRONICOTINAMIDE ADENINE DINUCLEOTIDE (CCD ID: NAI) (formula: C₂₁H₂₉N₇O₁₄P₂) (labeled as "Ligand of Interest" by depositor).

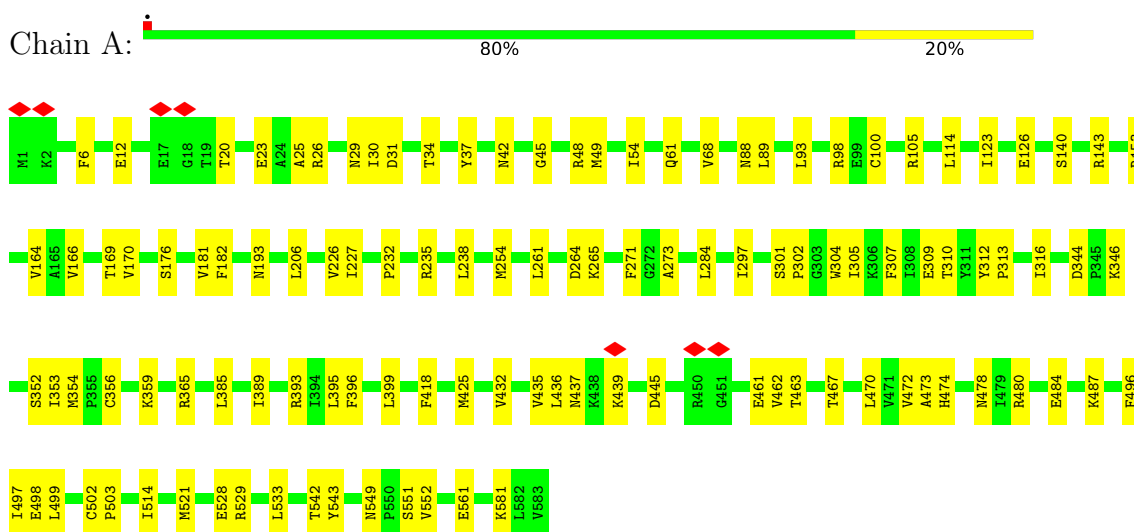


Mol	Chain	Residues	Atoms					AltConf
9	B	1	Total	C	N	O	P	0
			44	21	7	14	2	

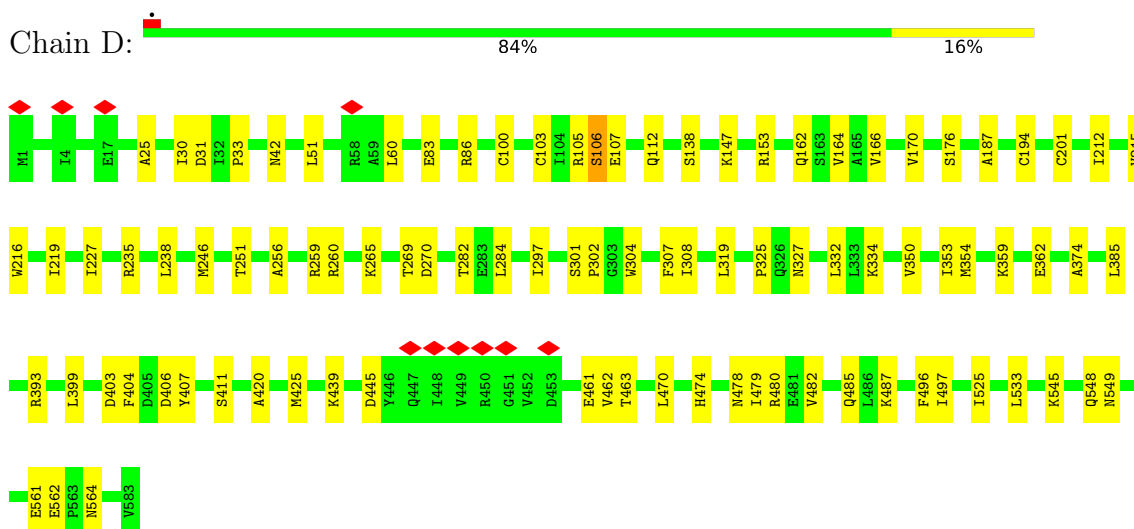
3 Residue-property plots

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: Iron hydrogenase HydA1



- Molecule 1: Iron hydrogenase HydA1



- Molecule 2: Iron hydrogenase HydB



MET	ALA	TYR	GLY	LYS	THR	PHE	SER	GLN	ILE	LEU	ILE	CYS	GLY	GLY	THR	CYS	THR	SER	SER	GLY	SER	MET	VAL	LEU	VAL	LYS	GLY	LEU	LEU	LYS	LYS	ASP	ASP	ILE	LEU	ASP	GLY	GLU	VAL	GLY	VAL	VAL	VAL	THR	THR	GLY	CYS	PHE	GLY	LEU	CYS	GLY	LEU	GLN	PRO	VAL	VAL	ILE	VAL	VAL
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TYR	PRO	GLY	THR	PHE	TYR	SER	ARG	VAL	VAL	GLU	ASN	ILE	ASP	ALA	ALA	ASP	ILE	PRO	GLY	GLU	THR	MET	VAL	GLY	LEU	HIS	VAL	LYS	GLY	ARG	PRO	LEU	LEU	ASP	ARG	LEU	ILE	TYR	ASN	GLY	GLU	ASP	GLY	ASP	GLY	HIS	HIS	PRO	PHE	PHE	CYS	LEU	LYS	GLY	ARG	ARG	ILE	ALA	LEU
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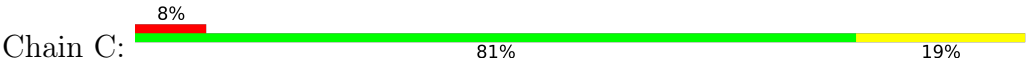
ALA	ASN	CYS	GLY	VAL	ILE	ASN	PRO	GLU	ASN	ILE	ASP	GLY	TYR	ILE	GLY	PHE	ASP	GLY	TYR	LEU	ALA	LEU	GLY	LYS	VAL	LEU	LEU	THR	MET	SER	PRO	V153	E158	G163	L164	R165	G166	R167	G168	G169	G189	A194	C195	D201	D207	L211	E212	E220	A221	N222	A223
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I224	A228	V229	Y237	V238	R239	A240	E241	N247	R248	Q250	I253	D254	Q255	A256	K257	E258	Y259	Q260	I261	E264	N265	I266	F267	E268	T269	D270	F271	S272	F273	D274	R278	A281	G282	F284	V285	C286	N283	N294	E297	R300	G301	E302	R306	P310
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V321	L322	N323	N324	V325	E326	T327	Y328	I331	P332	K333	I334	I335	L336	A343	E348	K349	S350	K351	G352	T353	K354	K355	F356	K361	P371	A392	F393	K394	Q397	G400	I415	N419	M427	M435	D436	E437	D438	M439	C440	M441	V444	L449	D450	F451
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C457	P462	M470	I473	L474	E475	R476	I477	K481	I487	S500	I517	F520	K545	I546	N547	A548	D549	T550	C551	K552	G555	I556	C557	A558	K559	K560	C561	P562	A563	E569	K570	K571	K572	C587	I588	E589	A590	C591	P592	F593	G594	S595	I596	A599
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• Molecule 3: Iron hydrogenase HydC



M1	A2	E3	L4	I5	V12	V13	M28	Q29	Q32	E33	T34	Q35	L43	E44	L45	T48	E52	L57	Y61	T65	Q69	F70	T71	Y78	L84	C88	G92	K116	A121	T122	R123	C124	V125	G126	A127	C128	A131	P132	N137	E138	E139
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V140	F141	L144	D147	E148	I149	P150	G151	E154	K155	Y156
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4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	172189	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	JEOL CRYO ARM 200	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	1.915	Depositor
Minimum map value	-1.295	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.038	Depositor
Recommended contour level	0.0534	Depositor
Map size ($\text{\AA}$)	222.72, 222.72, 222.72	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	0.87, 0.87, 0.87	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: HC1, FMN, FES, SF4, ZN, NAI

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	0.14	0/4507	0.38	0/6105
1	D	0.12	0/4507	0.36	0/6105
2	B	0.12	0/3391	0.35	0/4572
3	C	0.11	0/1207	0.31	0/1638
All	All	0.13	0/13612	0.36	0/18420

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	4442	0	4462	81	0
1	D	4442	0	4462	67	0
2	B	3331	0	3297	61	0
3	C	1188	0	1211	21	0
4	A	32	0	0	0	0
4	B	24	0	0	1	0
4	D	32	0	0	1	0
5	A	4	0	0	2	0
5	C	4	0	0	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	D	4	0	0	0	0
6	A	16	0	0	4	0
6	D	16	0	0	10	0
7	B	1	0	0	0	0
8	B	31	0	17	1	0
9	B	44	0	26	2	0
All	All	13611	0	13475	224	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 8.

All (224) 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:D:325:PRO:HD2	6:D:606:HC1:O6	1.57	1.05
2:B:435:MET:HG2	2:B:439:ASN:HD22	1.30	0.93
1:D:354:MET:HE1	6:D:606:HC1:C7	2.01	0.89
1:D:269:THR:HG21	6:D:606:HC1:O7	1.75	0.86
4:D:605:SF4:S3	6:D:606:HC1:C3	2.63	0.85
2:B:439:ASN:HD21	2:B:444:VAL:HG11	1.51	0.74
1:D:354:MET:HE2	1:D:359:LYS:HE2	1.69	0.74
1:A:49:MET:HE1	1:A:89:LEU:HD13	1.70	0.73
1:A:48:ARG:O	1:A:88:ASN:ND2	2.22	0.73
1:A:425:MET:HG3	1:A:472:VAL:HG22	1.72	0.72
1:A:393:ARG:HG2	1:D:31:ASP:HB3	1.73	0.70
1:D:354:MET:HE1	6:D:606:HC1:C5	2.22	0.70
1:D:106:SER:O	1:D:112:GLN:NE2	2.24	0.69
1:D:227:ILE:HG12	1:D:265:LYS:HB2	1.74	0.69
1:D:42:ASN:HD22	1:D:153:ARG:HG3	1.58	0.69
2:B:222:MET:HG3	2:B:273:PHE:HE2	1.57	0.69
2:B:587:CYS:HB3	4:B:602:SF4:S2	2.33	0.68
1:D:353:ILE:HD13	1:D:385:LEU:HD12	1.75	0.67
3:C:128:CYS:HB3	5:C:201:FES:S2	2.34	0.67
1:D:83:GLU:OE1	1:D:86:ARG:NH2	2.27	0.67
1:A:238:LEU:HD13	1:A:254:MET:HE2	1.75	0.67
1:D:162:GLN:NE2	1:D:194:CYS:SG	2.68	0.66
6:D:606:HC1:O4	6:D:606:HC1:S1	2.52	0.66
8:B:604:FMN:N1	8:B:604:FMN:H2'	2.11	0.66
2:B:449:LEU:HD11	2:B:470:MET:HB3	1.77	0.65
2:B:546:ILE:HG22	2:B:596:ILE:HG12	1.78	0.65
2:B:294:ASN:ND2	2:B:302:GLU:O	2.29	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:237:TYR:HH	2:B:286:CYS:HG	1.46	0.64
1:D:353:ILE:HG21	1:D:385:LEU:HD12	1.81	0.63
1:D:307:PHE:HZ	1:D:480:ARG:HE	1.44	0.63
1:D:270:ASP:OD2	1:D:411:SER:OG	2.16	0.63
2:B:397:GLN:NE2	2:B:400:GLY:O	2.33	0.62
1:A:42:ASN:HD22	1:A:153:ARG:HG3	1.64	0.62
1:A:227:ILE:HG12	1:A:265:LYS:HB2	1.80	0.62
1:A:297:ILE:HG22	1:A:497:ILE:HB	1.82	0.62
1:A:105:ARG:HH12	1:A:514:ILE:HG21	1.64	0.62
1:A:352:SER:HB2	1:A:354:MET:HE2	1.81	0.62
6:D:606:HC1:O3	6:D:606:HC1:S2	2.56	0.62
1:D:297:ILE:HG12	1:D:497:ILE:HB	1.83	0.61
1:A:312:TYR:OH	1:A:484:GLU:OE2	2.13	0.61
1:D:138:SER:HA	1:D:187:ALA:HB2	1.83	0.61
1:A:284:LEU:HD22	1:A:496:PHE:CZ	2.36	0.60
1:D:301:SER:HG	1:D:304:TRP:CD1	2.19	0.60
2:B:229:VAL:HG11	2:B:321:VAL:HG21	1.84	0.60
2:B:254:ASP:OD1	2:B:257:LYS:NZ	2.34	0.60
1:A:26:ARG:NH1	1:A:521:MET:SD	2.75	0.60
2:B:306:ARG:HD2	2:B:310:PRO:HD3	1.84	0.60
1:A:49:MET:HE3	1:A:114:LEU:HD13	1.83	0.59
1:A:54:ILE:HD12	1:A:61:GLN:HG3	1.83	0.59
2:B:324:ASN:ND2	2:B:326:GLU:OE2	2.35	0.59
1:D:325:PRO:HD2	6:D:606:HC1:C6	2.32	0.59
1:A:169:THR:O	2:B:300:ARG:NH1	2.36	0.59
2:B:487:ILE:HG23	2:B:517:ILE:HD11	1.84	0.59
1:A:284:LEU:HD23	1:A:432:VAL:HG21	1.85	0.59
3:C:28:MET:O	3:C:32:GLN:HG3	2.03	0.58
1:D:246:MET:HE2	1:D:525:ILE:HD11	1.84	0.58
1:A:462:VAL:HG12	1:A:463:THR:HG23	1.85	0.58
2:B:222:MET:HG3	2:B:273:PHE:CE2	2.39	0.58
2:B:212:GLU:HB2	2:B:248:ARG:HH11	1.69	0.57
1:D:105:ARG:NH2	1:D:201:CYS:O	2.37	0.57
2:B:281:ALA:O	3:C:69:GLN:NE2	2.37	0.57
1:D:354:MET:HE1	6:D:606:HC1:O5	2.05	0.57
1:D:259:ARG:NH2	1:D:403:ASP:O	2.37	0.57
1:A:302:PRO:HA	1:A:305:ILE:HG22	1.87	0.56
1:D:403:ASP:OD1	1:D:404:PHE:N	2.37	0.56
1:A:284:LEU:HD22	1:A:496:PHE:HZ	1.70	0.56
1:D:425:MET:HE2	1:D:496:PHE:HB3	1.87	0.56
1:A:356:CYS:SG	6:A:606:HC1:C3	2.94	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:353:ILE:HG21	1:A:385:LEU:HD22	1.86	0.56
3:C:128:CYS:CB	5:C:201:FES:S2	2.94	0.56
2:B:451:PHE:HD2	3:C:123:ARG:HH21	1.52	0.56
1:A:437:ASN:HB2	1:A:463:THR:HG22	1.88	0.55
1:A:425:MET:HG2	1:A:498:GLU:OE1	2.07	0.55
1:A:435:VAL:HG12	1:A:436:LEU:HD22	1.89	0.55
1:A:439:LYS:NZ	1:A:461:GLU:O	2.40	0.55
2:B:323:ASN:HB2	2:B:328:TYR:CZ	2.42	0.54
1:D:334:LYS:NZ	1:D:374:ALA:O	2.40	0.54
1:A:143:ARG:HG2	1:A:206:LEU:HD23	1.89	0.54
1:A:164:VAL:HG12	1:A:166:VAL:HG13	1.89	0.54
1:A:93:LEU:O	1:A:98:ARG:NH1	2.41	0.54
2:B:392:ALA:HB3	2:B:437:GLU:HB2	1.90	0.54
1:D:238:LEU:HD11	1:D:385:LEU:HD22	1.88	0.53
1:A:396:PHE:HA	1:A:399:LEU:HD23	1.91	0.53
2:B:247:ASN:OD1	2:B:250:GLN:NE2	2.41	0.53
1:A:45:GLY:HA2	5:A:604:FES:S1	2.49	0.53
1:A:170:VAL:O	1:A:176:SER:HA	2.09	0.52
2:B:169:GLY:HA3	9:B:606:NAI:H1D	1.92	0.52
1:D:354:MET:CE	6:D:606:HC1:O5	2.58	0.52
1:A:226:VAL:HG13	1:A:264:ASP:H	1.74	0.52
3:C:132:PRO:HD2	3:C:144:LEU:H	1.74	0.52
1:D:425:MET:SD	1:D:470:LEU:HB3	2.50	0.52
1:A:271:PHE:HE1	1:A:551:SER:HB3	1.74	0.51
2:B:212:GLU:OE1	2:B:248:ARG:NH1	2.42	0.51
2:B:394:LYS:HD2	2:B:437:GLU:HA	1.92	0.51
1:D:406:ASP:HB3	1:D:407:TYR:CD1	2.46	0.51
2:B:476:ARG:HG3	2:B:481:LYS:HB2	1.93	0.51
1:A:140:SER:OG	1:A:193:ASN:OD1	2.28	0.51
2:B:441:MET:HG3	2:B:520:PHE:HD2	1.74	0.51
2:B:415:ILE:HG22	2:B:427:MET:HE1	1.94	0.50
2:B:441:MET:HG3	2:B:520:PHE:CD2	2.46	0.50
1:A:549:ASN:HB3	1:A:552:VAL:HG22	1.94	0.50
1:A:313:PRO:O	1:A:316:ILE:HG12	2.11	0.50
1:A:353:ILE:HD13	1:A:385:LEU:HD22	1.93	0.50
2:B:163:GLY:HA3	2:B:351:LYS:HD2	1.93	0.50
2:B:281:ALA:HB1	3:C:69:GLN:HG3	1.94	0.50
2:B:435:MET:HE2	2:B:439:ASN:HB2	1.92	0.50
1:A:25:ALA:HB1	1:A:30:ILE:HB	1.94	0.50
2:B:285:VAL:HG21	2:B:457:CYS:HB3	1.92	0.50
2:B:331:ILE:HD12	2:B:334:ILE:HB	1.94	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:181:VAL:HG11	3:C:57:LEU:HB3	1.93	0.49
1:A:301:SER:OG	1:A:304:TRP:HD1	1.94	0.49
1:D:439:LYS:NZ	1:D:461:GLU:O	2.40	0.49
1:A:310:THR:HG23	1:A:581:LYS:HB3	1.94	0.49
2:B:195:CYS:SG	2:B:328:TYR:HE2	2.36	0.49
3:C:13:VAL:HG11	3:C:45:LEU:HD22	1.95	0.49
2:B:293:MET:HE2	2:B:310:PRO:HB3	1.95	0.48
3:C:29:GLN:O	3:C:33:GLU:HG2	2.12	0.48
1:A:301:SER:HG	1:A:304:TRP:HD1	1.61	0.48
2:B:250:GLN:HA	2:B:253:ILE:HG22	1.95	0.48
1:A:273:ALA:HB1	1:A:418:PHE:CE2	2.49	0.47
2:B:165:ARG:NH2	2:B:350:SER:OG	2.48	0.47
3:C:35:GLN:OE1	3:C:71:THR:OG1	2.30	0.47
1:D:327:ASN:OD1	1:D:362:GLU:OE2	2.32	0.47
1:D:561:GLU:HB3	1:D:562:GLU:OE1	2.15	0.47
1:A:385:LEU:O	1:A:389:ILE:HG12	2.15	0.47
1:D:474:HIS:O	1:D:478:ASN:ND2	2.47	0.46
1:A:474:HIS:O	1:A:478:ASN:ND2	2.43	0.46
1:A:528:GLU:OE2	1:A:529:ARG:HG3	2.15	0.46
1:D:308:ILE:HD13	1:D:319:LEU:HD11	1.96	0.46
2:B:195:CYS:SG	2:B:222:MET:HE1	2.56	0.46
3:C:84:LEU:HD12	3:C:121:ALA:HB1	1.98	0.46
1:A:34:THR:HG23	5:A:604:FES:S2	2.56	0.46
1:A:182:PHE:CE1	3:C:43:LEU:HB3	2.51	0.46
2:B:343:ALA:HA	2:B:351:LYS:HD3	1.98	0.45
3:C:141:PHE:HB3	3:C:144:LEU:HD11	1.99	0.45
1:A:29:ASN:HD21	1:D:399:LEU:HD23	1.82	0.45
1:A:301:SER:HG	1:A:304:TRP:CD1	2.34	0.45
1:A:309:GLU:OE2	1:A:365:ARG:NH2	2.49	0.45
2:B:462:PRO:HG2	2:B:500:SER:O	2.16	0.45
1:A:425:MET:HE3	1:A:470:LEU:HD22	1.99	0.45
2:B:239:ARG:NE	2:B:241:GLU:OE2	2.40	0.45
1:D:282:THR:HG22	1:D:564:ASN:HD22	1.81	0.45
1:A:461:GLU:HA	1:A:467:THR:HA	1.99	0.45
1:D:227:ILE:HB	1:D:350:VAL:HG12	1.99	0.44
6:A:606:HC1:O6	6:A:606:HC1:S2	2.72	0.44
1:A:302:PRO:HG2	1:A:359:LYS:HD3	2.00	0.44
1:A:393:ARG:CG	1:D:31:ASP:HB3	2.45	0.44
9:B:606:NAI:H2D	9:B:606:NAI:H6N	1.69	0.44
1:D:215:VAL:O	1:D:219:ILE:HG12	2.18	0.44
1:A:307:PHE:HZ	1:A:480:ARG:HE	1.66	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:259:TYR:HD2	2:B:261:ILE:HG13	1.83	0.44
1:A:100:CYS:HB2	1:D:100:CYS:HB2	1.99	0.43
3:C:124:CYS:HA	5:C:201:FES:S1	2.57	0.43
1:D:25:ALA:HB1	1:D:30:ILE:HB	1.99	0.43
2:B:473:ILE:O	2:B:477:ILE:HG12	2.18	0.43
1:A:49:MET:O	1:A:49:MET:HG3	2.17	0.43
1:A:126:GLU:HA	1:A:126:GLU:OE1	2.19	0.43
2:B:588:ILE:HG13	2:B:596:ILE:HB	2.01	0.43
1:D:332:LEU:HD12	1:D:332:LEU:HA	1.89	0.43
2:B:545:LYS:HD2	2:B:545:LYS:HA	1.80	0.43
2:B:207:ASP:O	2:B:211:LEU:HD23	2.19	0.43
2:B:439:ASN:OD1	2:B:440:CYS:N	2.52	0.43
3:C:69:GLN:OE1	3:C:69:GLN:N	2.52	0.43
1:D:170:VAL:O	1:D:176:SER:HA	2.18	0.43
1:D:284:LEU:HD22	1:D:496:PHE:CE2	2.54	0.43
1:A:20:THR:HG23	1:A:23:GLU:H	1.84	0.42
2:B:353:THR:HG22	2:B:371:PRO:HA	2.00	0.42
2:B:473:ILE:HG23	2:B:474:LEU:HD12	2.00	0.42
1:D:359:LYS:HA	1:D:362:GLU:HB3	2.01	0.42
1:D:301:SER:HA	1:D:302:PRO:HD3	1.95	0.42
3:C:61:TYR:O	3:C:65:THR:OG1	2.25	0.42
1:D:105:ARG:O	1:D:107:GLU:N	2.52	0.42
1:D:212:ILE:HG22	1:D:216:TRP:CD1	2.54	0.42
1:A:93:LEU:HD23	1:A:123:ILE:HD11	2.00	0.42
1:A:304:TRP:CZ3	1:A:499:LEU:HD12	2.55	0.42
6:A:606:HC1:O7	6:A:606:HC1:S1	2.72	0.42
1:D:164:VAL:HG12	1:D:166:VAL:HG13	2.02	0.42
1:A:425:MET:HE1	1:A:496:PHE:HB2	2.01	0.42
2:B:167:ARG:HB3	2:B:354:LYS:NZ	2.34	0.42
2:B:361:LYS:HD2	2:B:361:LYS:HA	1.83	0.42
2:B:237:TYR:OH	2:B:286:CYS:SG	2.62	0.42
1:D:103:CYS:SG	1:D:147:LYS:NZ	2.90	0.42
1:A:542:THR:HG22	1:A:543:TYR:CD2	2.55	0.41
1:D:51:LEU:HD23	1:D:60:LEU:HB2	2.01	0.41
1:A:487:LYS:HB3	1:A:487:LYS:HE2	1.83	0.41
2:B:220:GLU:O	2:B:224:ILE:HG12	2.20	0.41
2:B:220:GLU:OE2	2:B:332:PRO:HG3	2.20	0.41
1:D:549:ASN:HB3	1:D:552:VAL:HG12	2.02	0.41
1:A:473:ALA:HB3	1:A:499:LEU:HD23	2.01	0.41
2:B:441:MET:HA	2:B:444:VAL:HG22	2.01	0.41
1:D:479:ILE:HA	1:D:482:VAL:HG12	2.01	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:344:ASP:OD1	1:A:346:LYS:HG2	2.21	0.41
1:A:480:ARG:O	1:A:484:GLU:HG2	2.21	0.41
1:A:533:LEU:HD23	1:A:533:LEU:HA	1.91	0.41
1:D:256:ALA:O	1:D:260:ARG:HG2	2.20	0.41
1:D:445:ASP:N	1:D:445:ASP:OD1	2.53	0.41
2:B:167:ARG:HB3	2:B:354:LYS:HZ2	1.85	0.41
1:D:482:VAL:HA	1:D:485:GLN:HG2	2.01	0.41
1:D:487:LYS:HE2	1:D:487:LYS:HB3	1.77	0.41
2:B:283:ALA:HB3	2:B:286:CYS:HB3	2.02	0.41
1:A:6:PHE:O	1:A:12:GLU:HA	2.21	0.41
1:A:6:PHE:CD2	1:A:68:VAL:HG11	2.55	0.41
1:A:34:THR:CG2	1:A:37:TYR:HB3	2.51	0.41
1:A:502:CYS:HA	1:A:503:PRO:HD3	1.97	0.41
2:B:278:ARG:HA	2:B:278:ARG:HD3	1.77	0.41
3:C:5:ILE:HD13	3:C:12:VAL:HG21	2.03	0.41
3:C:48:THR:O	3:C:52:GLU:OE1	2.39	0.41
3:C:78:TYR:HE2	3:C:116:LYS:HE3	1.86	0.41
3:C:88:CYS:HA	3:C:131:ALA:HB1	2.03	0.41
1:D:420:ALA:HB2	1:D:533:LEU:HD12	2.02	0.41
1:A:232:PRO:HA	1:A:235:ARG:NH1	2.36	0.41
2:B:194:ALA:O	2:B:322:LEU:HD13	2.21	0.41
1:A:261:LEU:HD21	1:A:389:ILE:HD13	2.03	0.40
1:A:395:LEU:HD11	1:D:31:ASP:HB2	2.02	0.40
1:A:445:ASP:N	1:A:445:ASP:OD1	2.51	0.40
1:D:304:TRP:HA	1:D:307:PHE:HB3	2.03	0.40
1:D:462:VAL:HG12	1:D:463:THR:HG23	2.02	0.40
2:B:354:LYS:HD3	2:B:356:PHE:HE1	1.85	0.40
1:D:235:ARG:HD3	1:D:251:THR:OG1	2.22	0.40
1:D:545:LYS:HD2	1:D:548:GLN:NE2	2.35	0.40
1:A:31:ASP:HB3	1:D:393:ARG:HG3	2.02	0.40
1:A:354:MET:HB3	6:A:606:HC1:O4	2.22	0.40
1:A:393:ARG:HH12	1:D:33:PRO:HB3	1.86	0.40
1:D:301:SER:OG	1:D:304:TRP:NE1	2.54	0.40

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	
1	A	581/583 (100%)	556 (96%)	24 (4%)	1 (0%)	44	72
1	D	581/583 (100%)	562 (97%)	18 (3%)	1 (0%)	44	72
2	B	445/599 (74%)	437 (98%)	8 (2%)	0	100	100
3	C	154/156 (99%)	150 (97%)	4 (3%)	0	100	100
All	All	1761/1921 (92%)	1705 (97%)	54 (3%)	2 (0%)	50	78

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	106	SER
1	A	561	GLU

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	
1	A	492/492 (100%)	492 (100%)	0	100	100
1	D	492/492 (100%)	492 (100%)	0	100	100
2	B	349/480 (73%)	349 (100%)	0	100	100
3	C	130/130 (100%)	130 (100%)	0	100	100
All	All	1463/1594 (92%)	1463 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	162	GLN
2	B	419	ASN
3	C	94	GLN
1	D	29	ASN
1	D	42	ASN
1	D	229	GLN
1	D	290	ASN
1	D	327	ASN
1	D	397	ASN
1	D	548	GLN
1	D	564	ASN
1	D	569	HIS
1	D	573	HIS

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 19 ligands modelled in this entry, 1 is monoatomic - leaving 18 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
9	NAI	B	606	8,2	42,48,48	0.50	0	47,73,73	0.58	1 (2%)
4	SF4	B	603	2	0,12,12	-	-	-		
4	SF4	A	602	1	0,12,12	-	-	-		
4	SF4	D	601	1	0,12,12	-	-	-		
4	SF4	D	605	1	0,12,12	-	-	-		
6	HC1	D	606	1	1,18,18	1.13	0	-		
4	SF4	B	605	2	0,12,12	-	-	-		
4	SF4	A	601	1	0,12,12	-	-	-		
5	FES	D	604	1	0,4,4	-	-	-		
4	SF4	D	603	1	0,12,12	-	-	-		
8	FMN	B	604	9	33,33,33	2.11	12 (36%)	48,50,50	2.86	14 (29%)
4	SF4	A	605	6,1	0,12,12	-	-	-		
4	SF4	D	602	1	0,12,12	-	-	-		
4	SF4	B	602	2	0,12,12	-	-	-		
5	FES	C	201	3	0,4,4	-	-	-		
6	HC1	A	606	4	1,18,18	1.11	0	-		
5	FES	A	604	1	0,4,4	-	-	-		
4	SF4	A	603	1	0,12,12	-	-	-		

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
9	NAI	B	606	8,2	-	15/25/72/72	0/5/5/5
4	SF4	B	603	2	-	-	0/6/5/5
4	SF4	A	602	1	-	-	0/6/5/5
4	SF4	D	601	1	-	-	0/6/5/5
4	SF4	D	605	1	-	-	0/6/5/5
6	HC1	D	606	1	-	-	0/3/3/3
4	SF4	B	605	2	-	-	0/6/5/5
4	SF4	A	601	1	-	-	0/6/5/5
5	FES	D	604	1	-	-	0/1/1/1
8	FMN	B	604	9	-	8/18/18/18	0/3/3/3
4	SF4	D	603	1	-	-	0/6/5/5
4	SF4	A	605	6,1	-	-	0/6/5/5
4	SF4	D	602	1	-	-	0/6/5/5
4	SF4	B	602	2	-	-	0/6/5/5
5	FES	C	201	3	-	-	0/1/1/1
6	HC1	A	606	4	-	-	0/3/3/3
5	FES	A	604	1	-	-	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	SF4	A	603	1	-	-	0/6/5/5

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	B	604	FMN	C10-N1	5.02	1.43	1.33
8	B	604	FMN	C9A-C5A	3.74	1.47	1.41
8	B	604	FMN	C4-N3	-3.34	1.32	1.38
8	B	604	FMN	C2-N3	-3.22	1.31	1.39
8	B	604	FMN	C4A-C4	3.14	1.56	1.44
8	B	604	FMN	C2-N1	2.97	1.43	1.36
8	B	604	FMN	C5A-N5	-2.44	1.34	1.39
8	B	604	FMN	C4A-C10	2.35	1.51	1.44
8	B	604	FMN	C9-C8	-2.22	1.36	1.39
8	B	604	FMN	C6-C7	-2.13	1.36	1.39
8	B	604	FMN	P-O2P	-2.06	1.46	1.54
8	B	604	FMN	C4'-C3'	-2.05	1.49	1.53

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	B	604	FMN	C4A-C10-N1	-10.24	100.96	124.73
8	B	604	FMN	C10-N1-C2	9.54	135.98	116.90
8	B	604	FMN	C4A-C10-N10	6.53	126.03	116.48
8	B	604	FMN	N10-C10-N1	5.10	133.01	118.35
8	B	604	FMN	C9A-N10-C10	-4.31	114.05	120.77
8	B	604	FMN	C10-C4A-N5	-4.28	115.77	124.86
8	B	604	FMN	C4-C4A-C10	3.95	123.44	116.79
8	B	604	FMN	C4-N3-C2	-3.59	119.01	125.64
8	B	604	FMN	C4A-C4-N3	3.52	122.12	113.19
8	B	604	FMN	C5A-C9A-N10	2.32	120.35	117.95
9	B	606	NAI	C5A-C6A-N6A	2.27	123.81	120.35
8	B	604	FMN	O4-C4-C4A	-2.21	120.75	126.60
8	B	604	FMN	C1'-C2'-C3'	2.14	115.76	109.79
8	B	604	FMN	O3'-C3'-C2'	-2.06	103.83	108.81
8	B	604	FMN	O3P-P-O2P	2.06	115.50	107.64

There are no chirality outliers.

All (23) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	B	604	FMN	C2'-C1'-N10-C10
8	B	604	FMN	N10-C1'-C2'-O2'
8	B	604	FMN	N10-C1'-C2'-C3'
8	B	604	FMN	C1'-C2'-C3'-O3'
8	B	604	FMN	C1'-C2'-C3'-C4'
8	B	604	FMN	O2'-C2'-C3'-O3'
9	B	606	NAI	C5B-O5B-PA-O3
9	B	606	NAI	PN-O3-PA-O5B
9	B	606	NAI	C3B-C4B-C5B-O5B
9	B	606	NAI	C3D-C4D-C5D-O5D
9	B	606	NAI	C2D-C1D-N1N-C6N
9	B	606	NAI	C2N-C3N-C7N-N7N
9	B	606	NAI	C2D-C1D-N1N-C2N
9	B	606	NAI	O4B-C4B-C5B-O5B
9	B	606	NAI	O4D-C4D-C5D-O5D
8	B	604	FMN	O2'-C2'-C3'-C4'
8	B	604	FMN	C4'-C5'-O5'-P
9	B	606	NAI	O4D-C1D-N1N-C6N
9	B	606	NAI	C5B-O5B-PA-O1A
9	B	606	NAI	C2N-C3N-C7N-O7N
9	B	606	NAI	C4D-C5D-O5D-PN
9	B	606	NAI	C4B-C5B-O5B-PA
9	B	606	NAI	PN-O3-PA-O2A

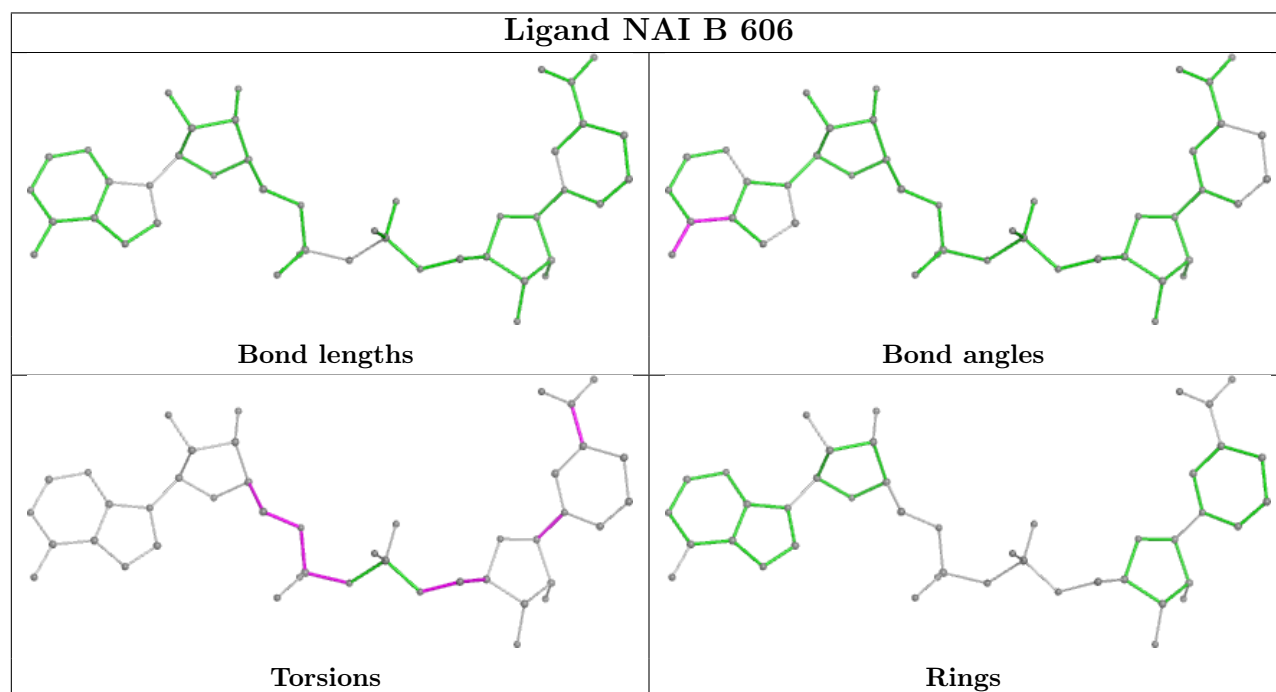
There are no ring outliers.

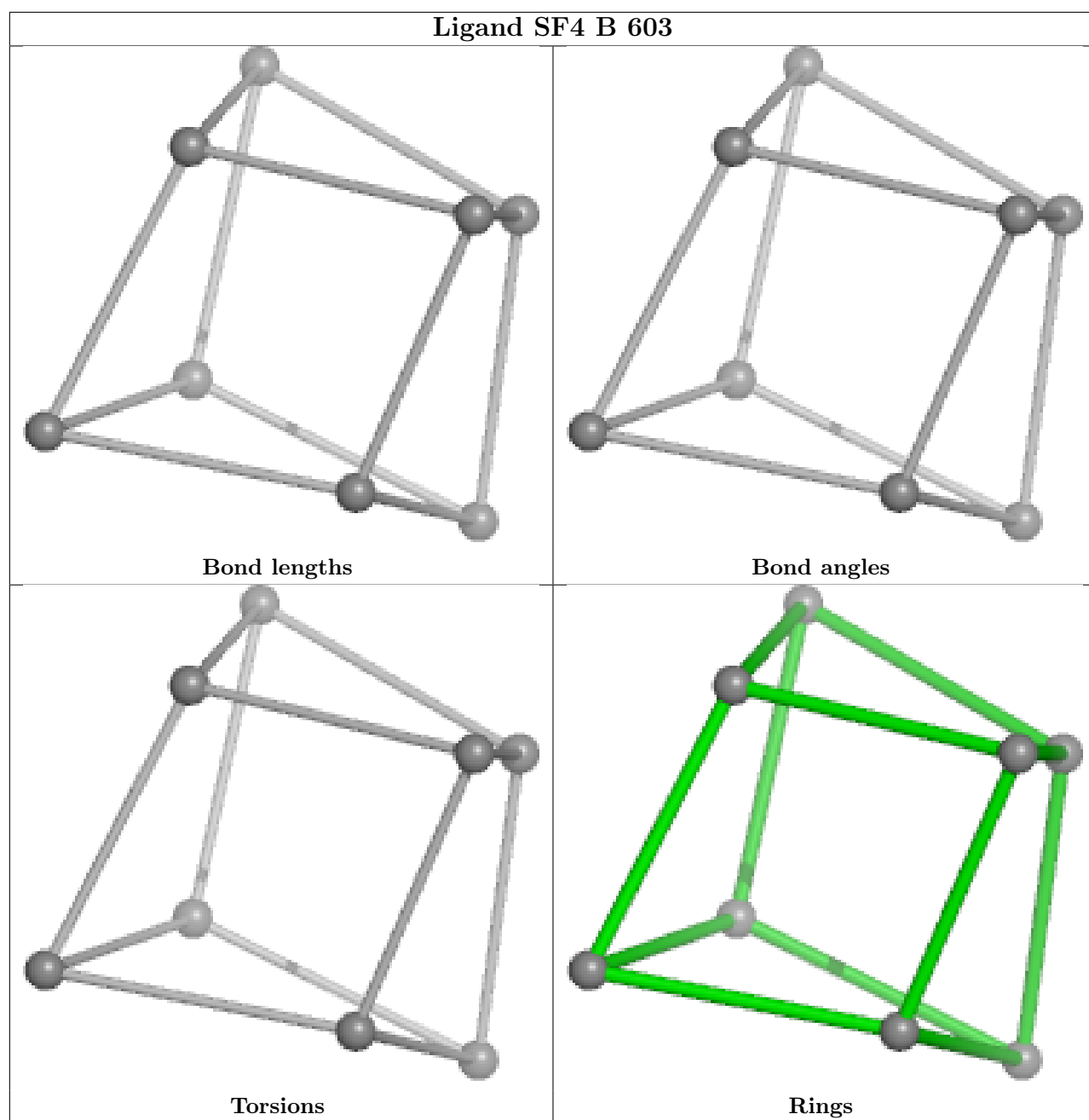
8 monomers are involved in 23 short contacts:

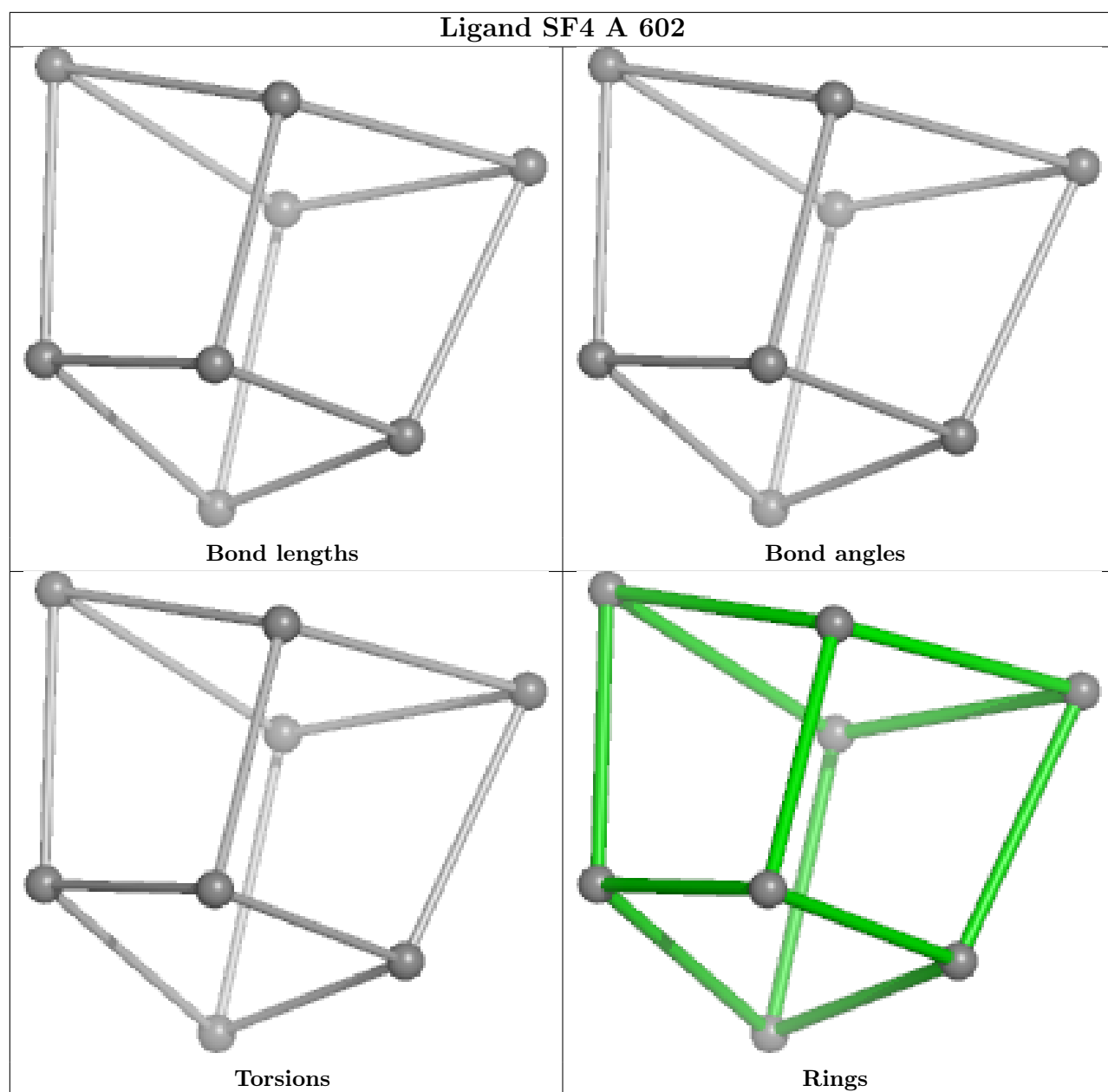
Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	B	606	NAI	2	0
4	D	605	SF4	1	0
6	D	606	HC1	10	0
8	B	604	FMN	1	0
4	B	602	SF4	1	0
5	C	201	FES	3	0
6	A	606	HC1	4	0
5	A	604	FES	2	0

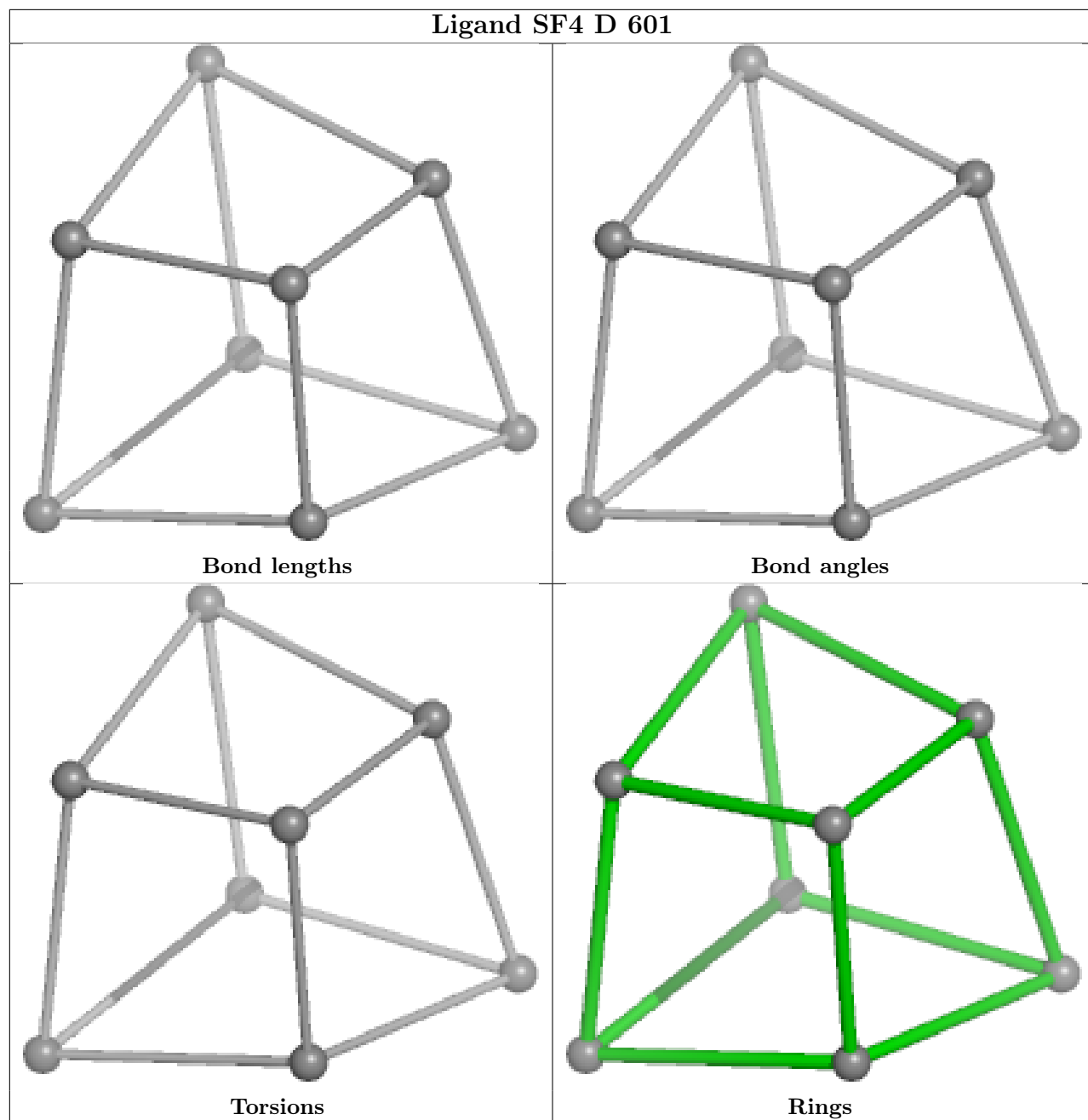
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be

highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

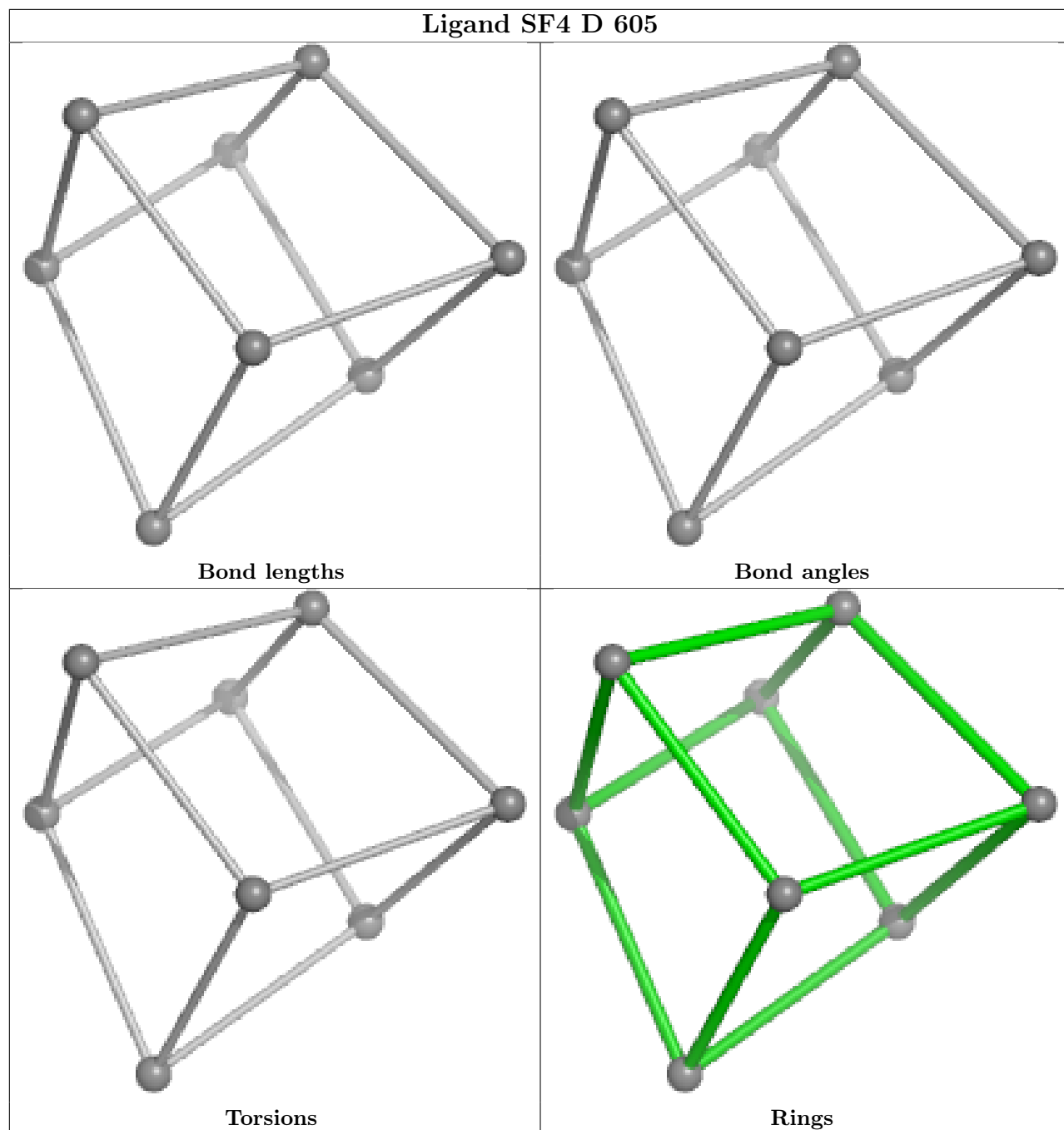


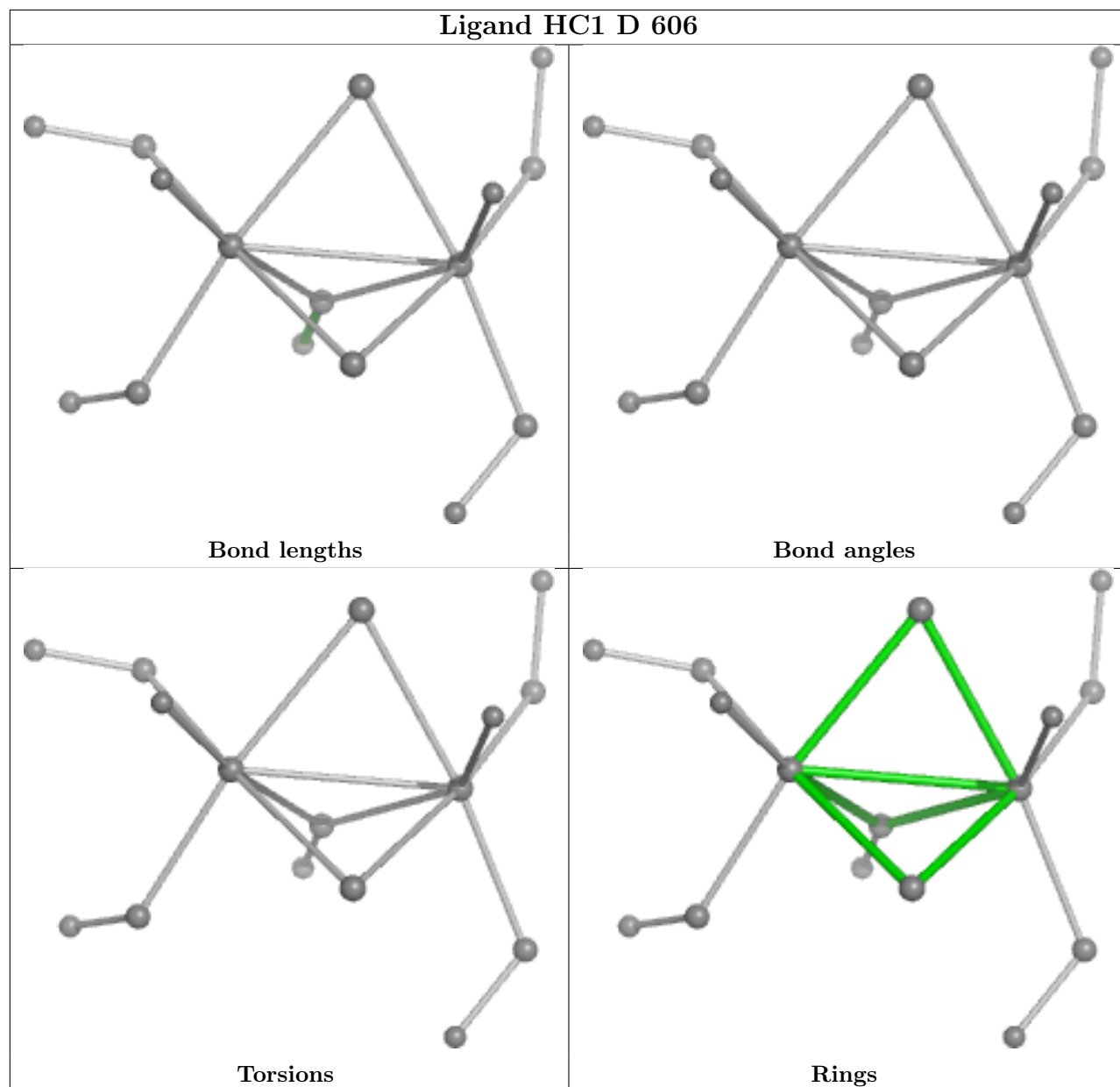




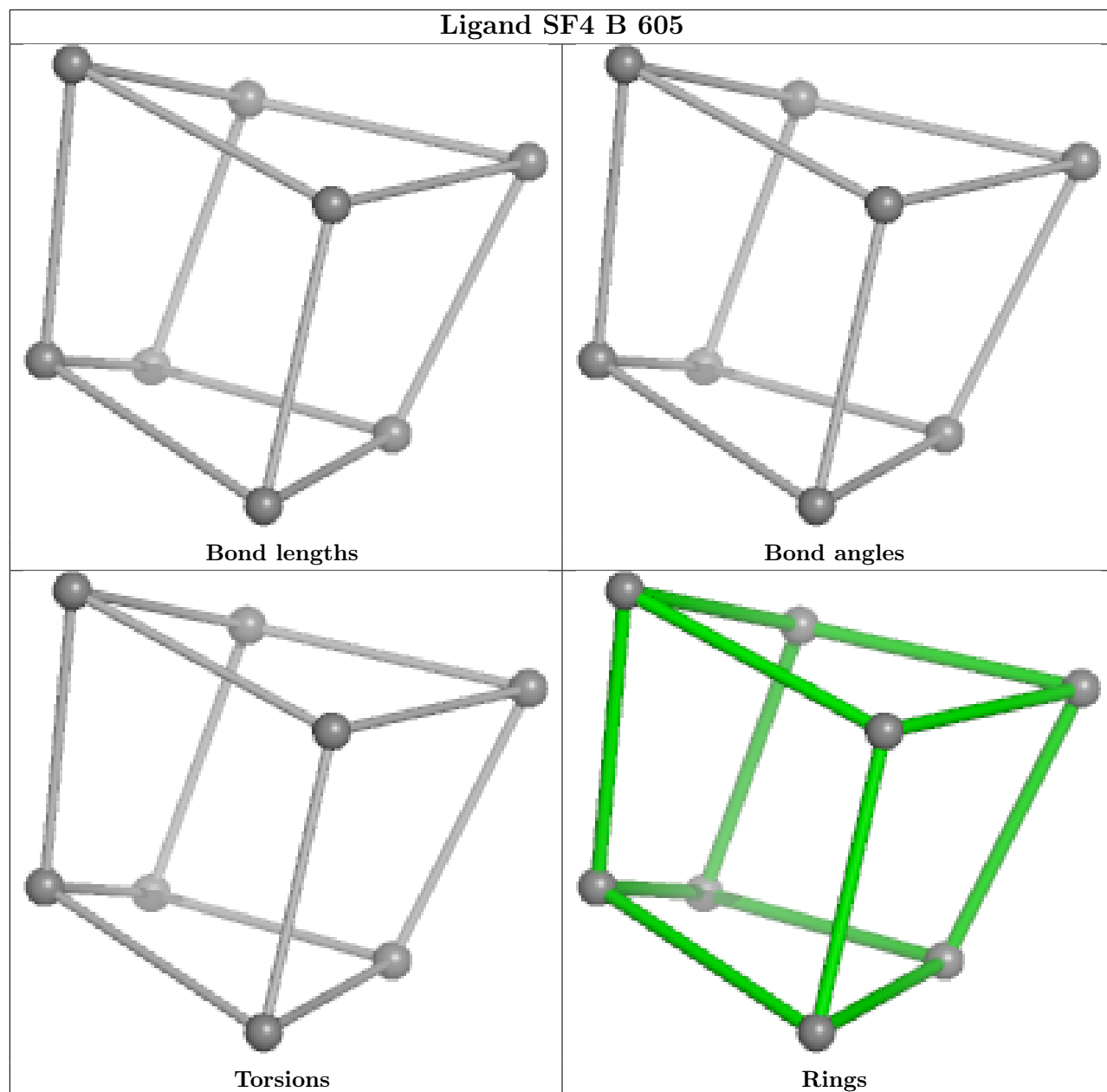


Ligand SF4 D 605

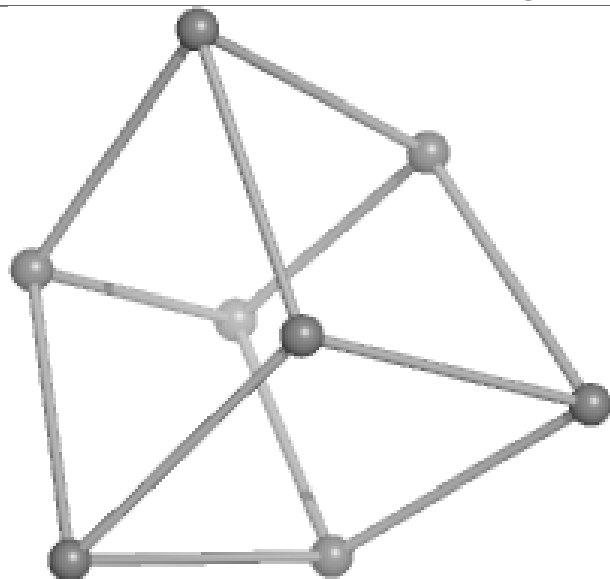




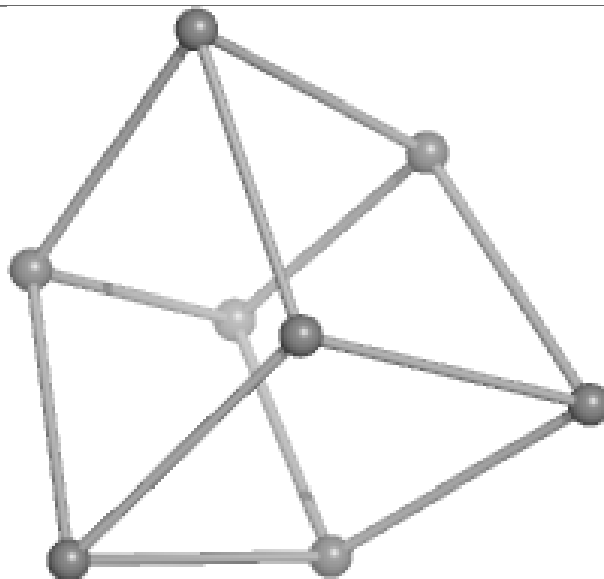
Ligand SF4 B 605



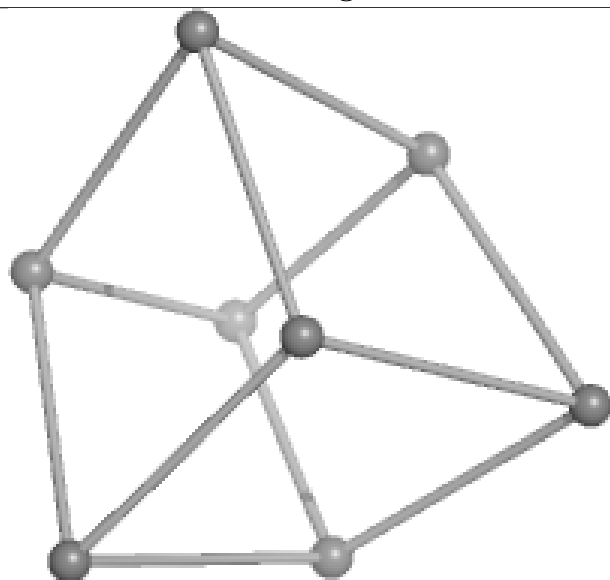
Ligand SF4 A 601



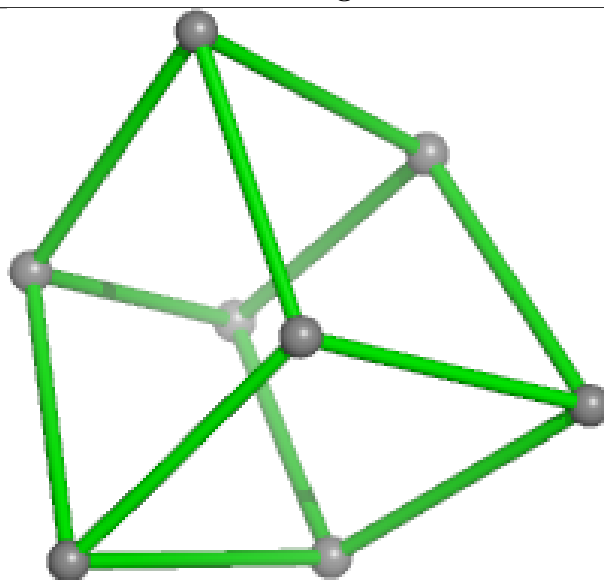
Bond lengths



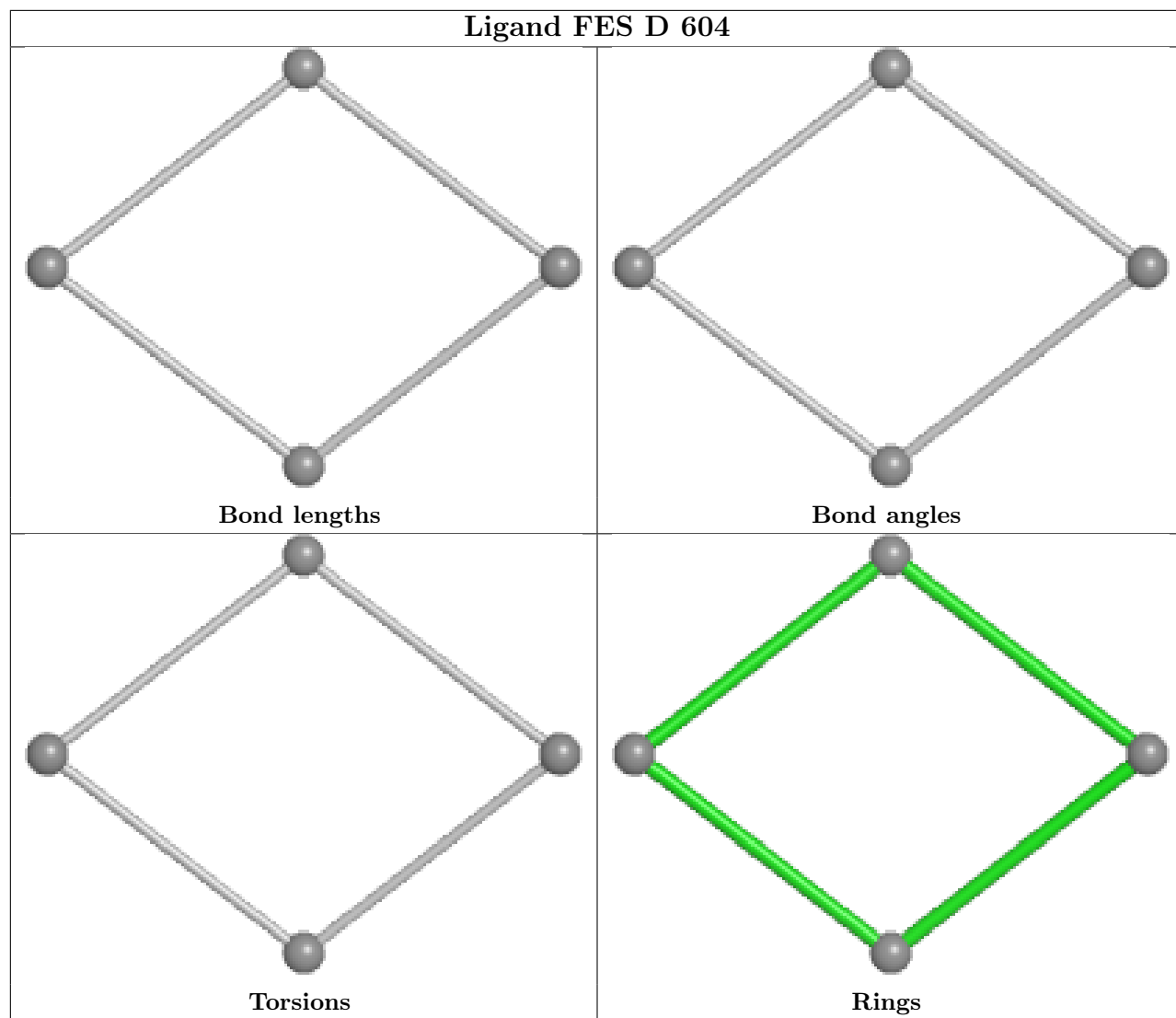
Bond angles

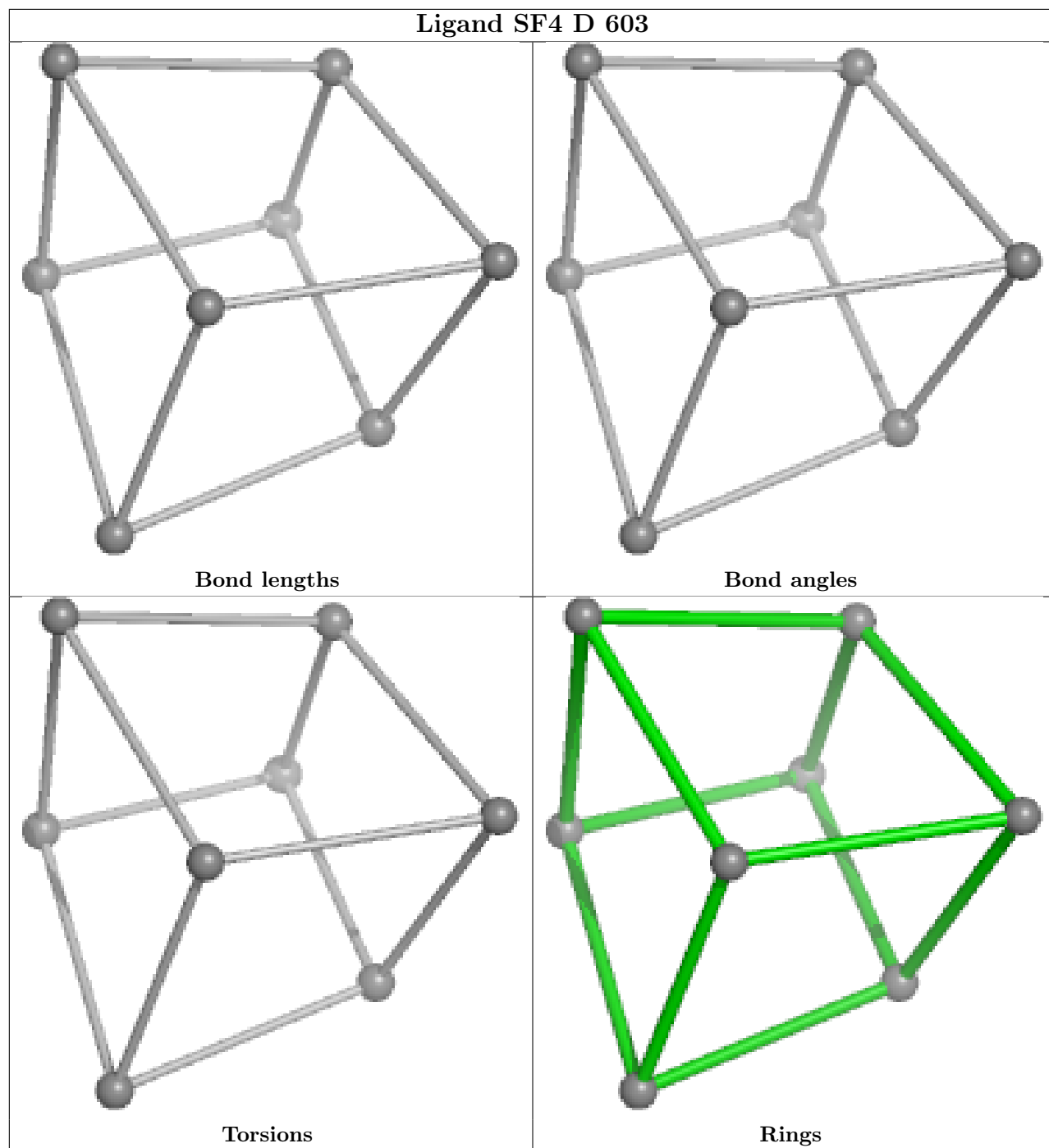


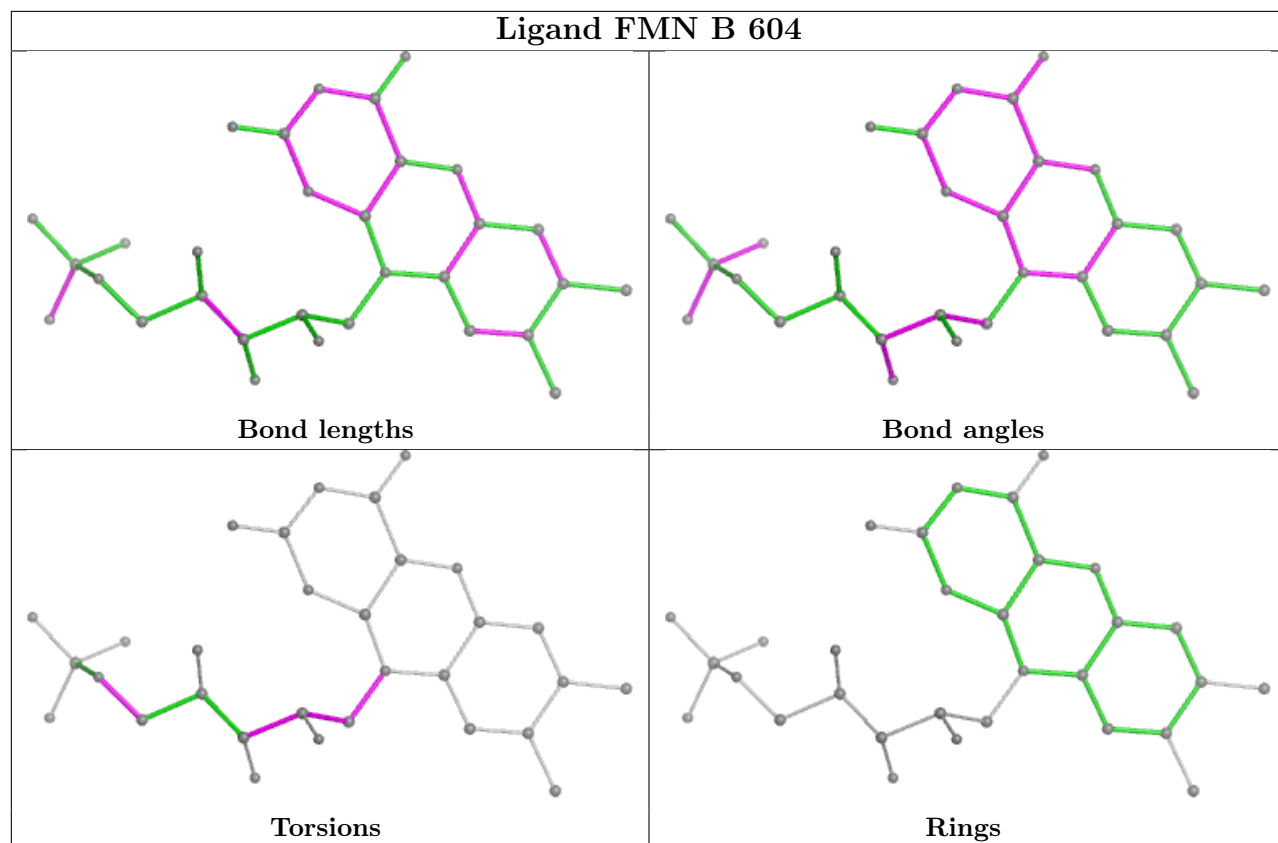
Torsions



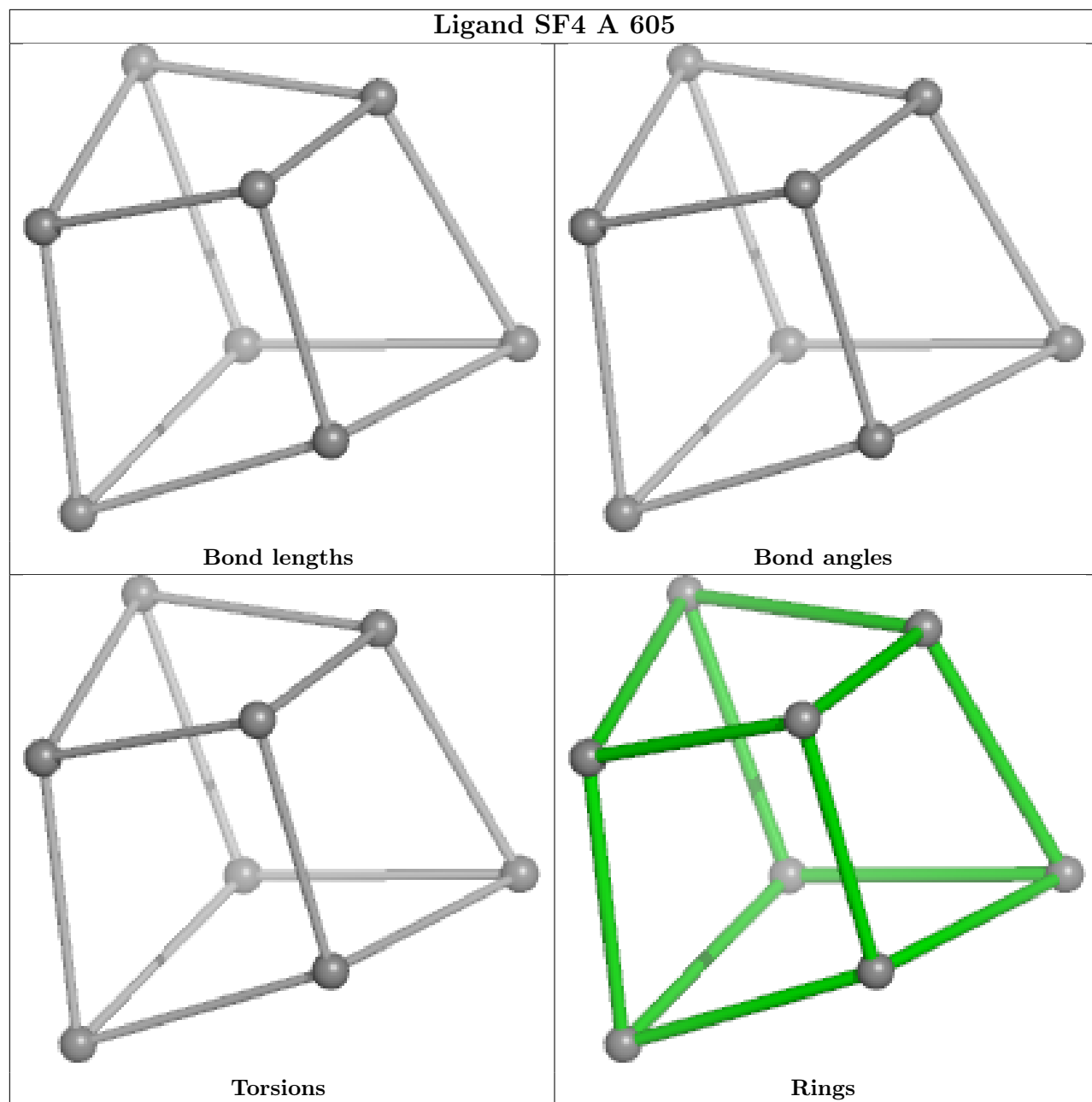
Rings

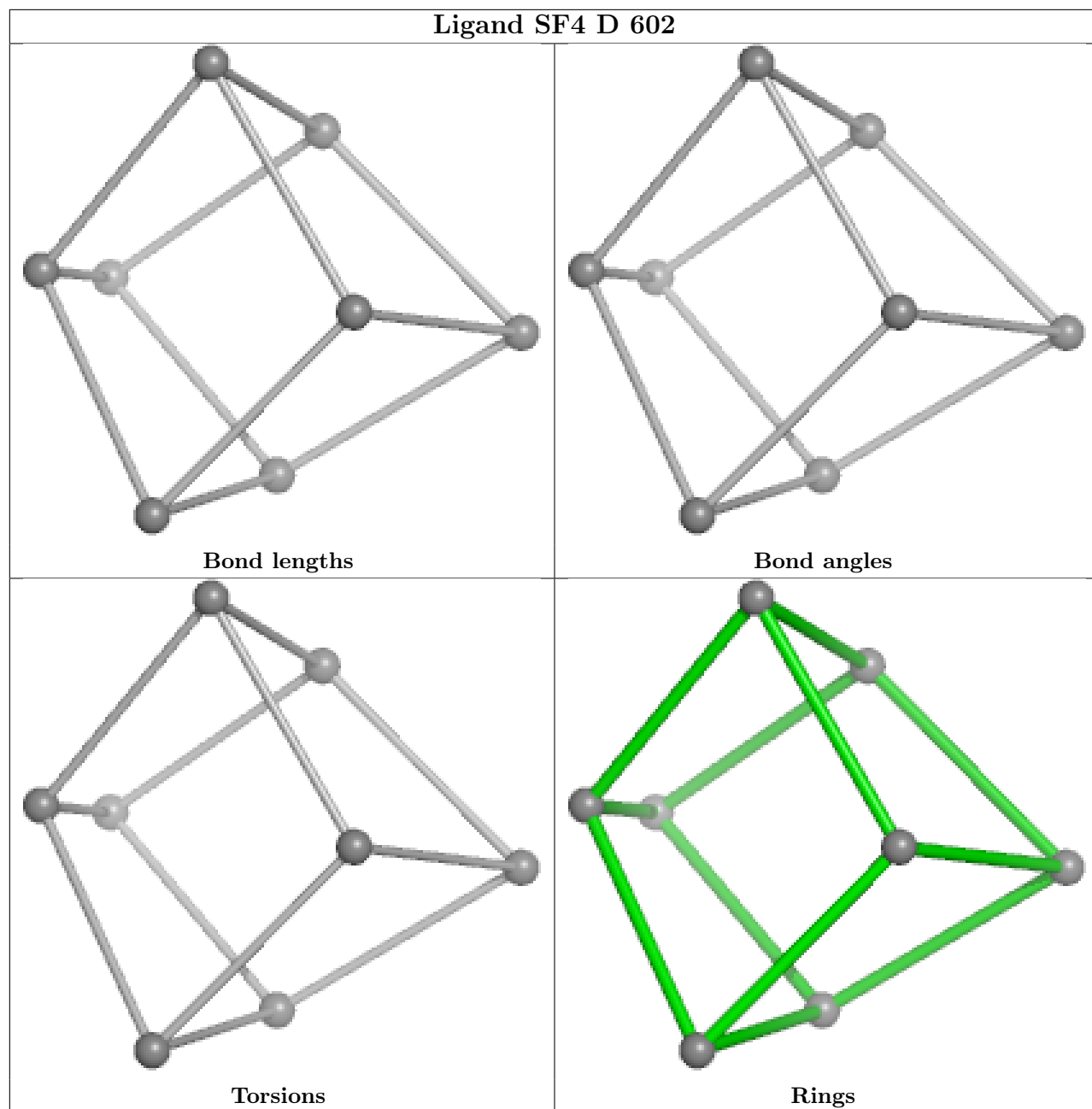


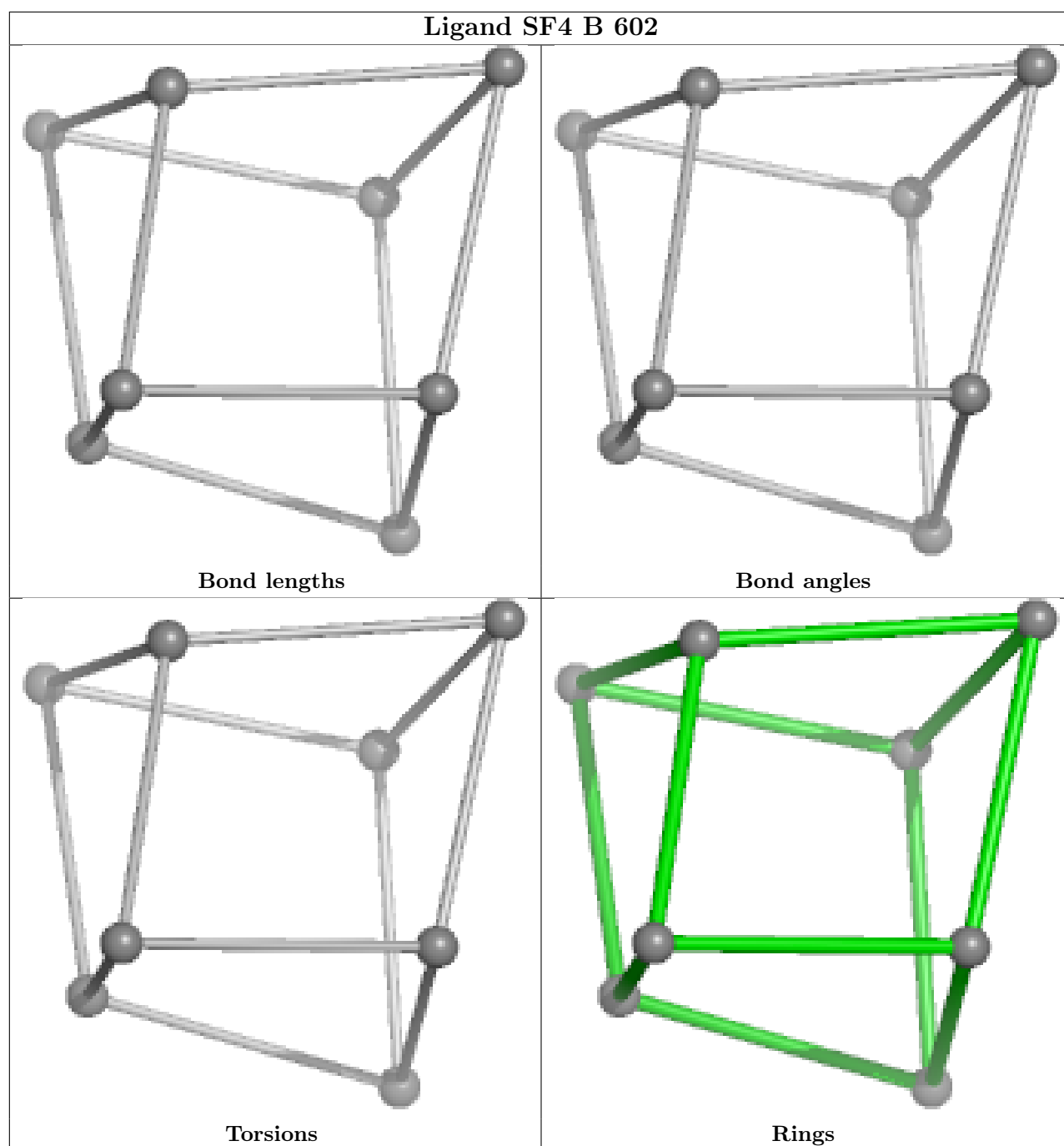


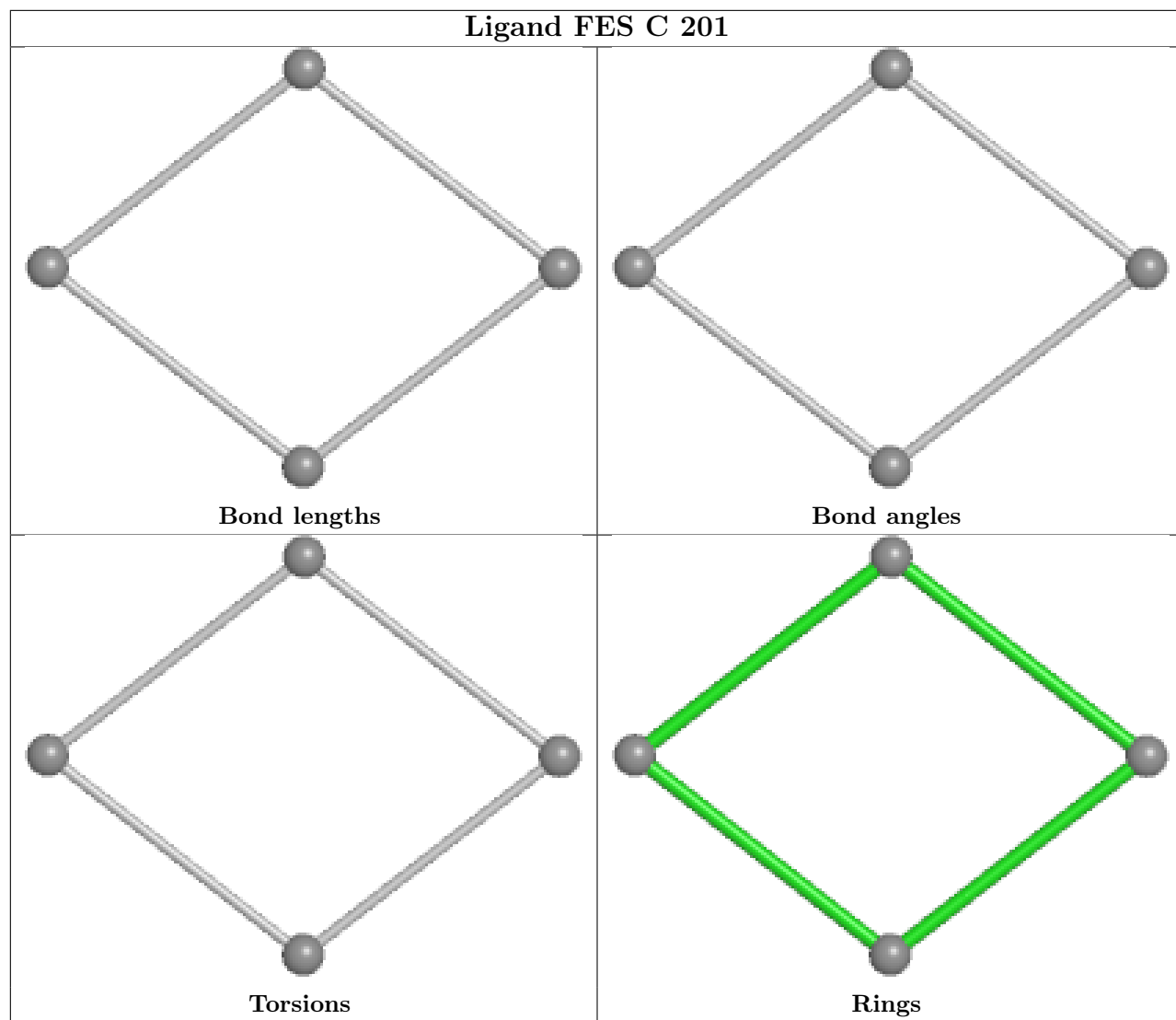


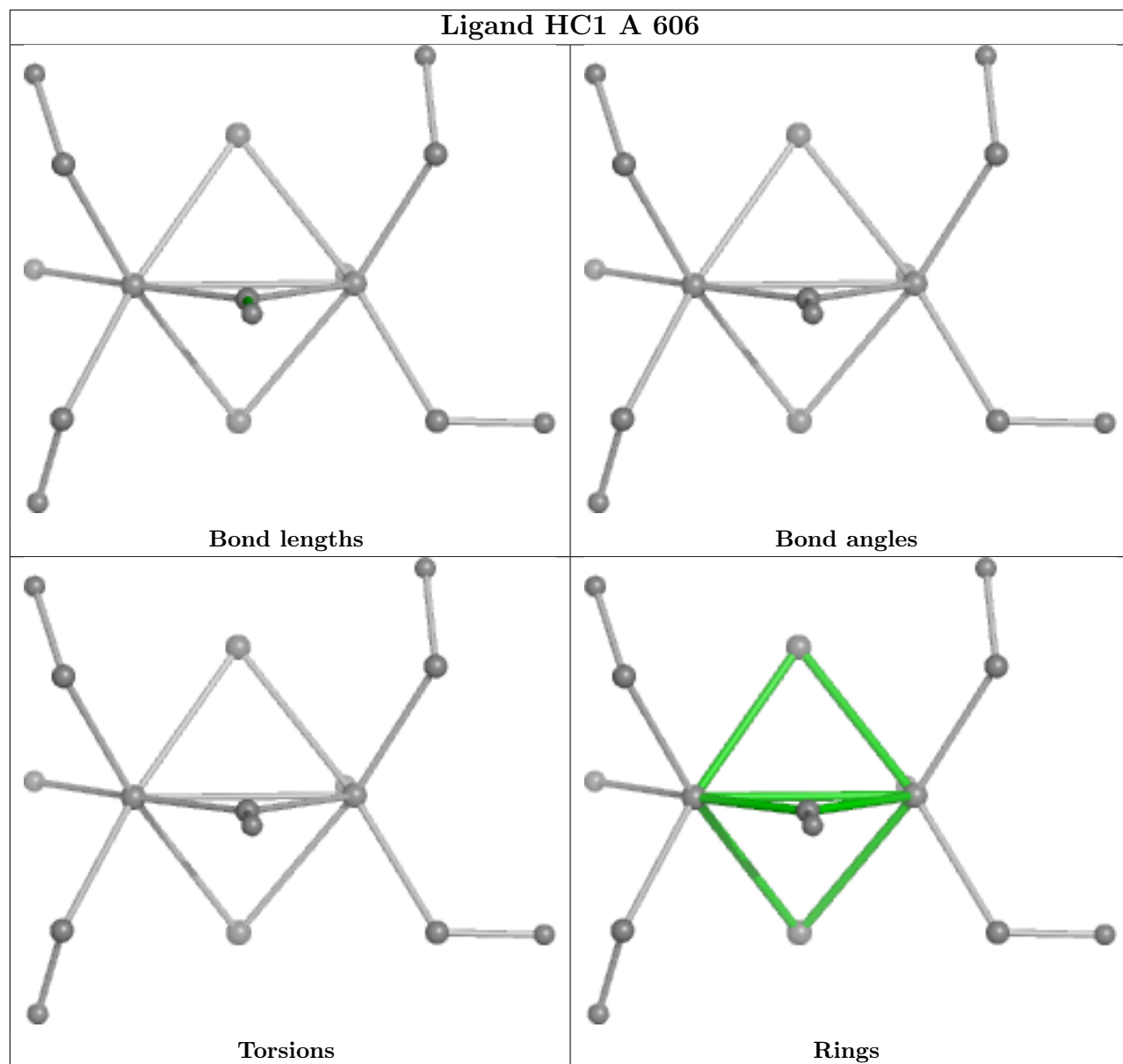
Ligand SF4 A 605

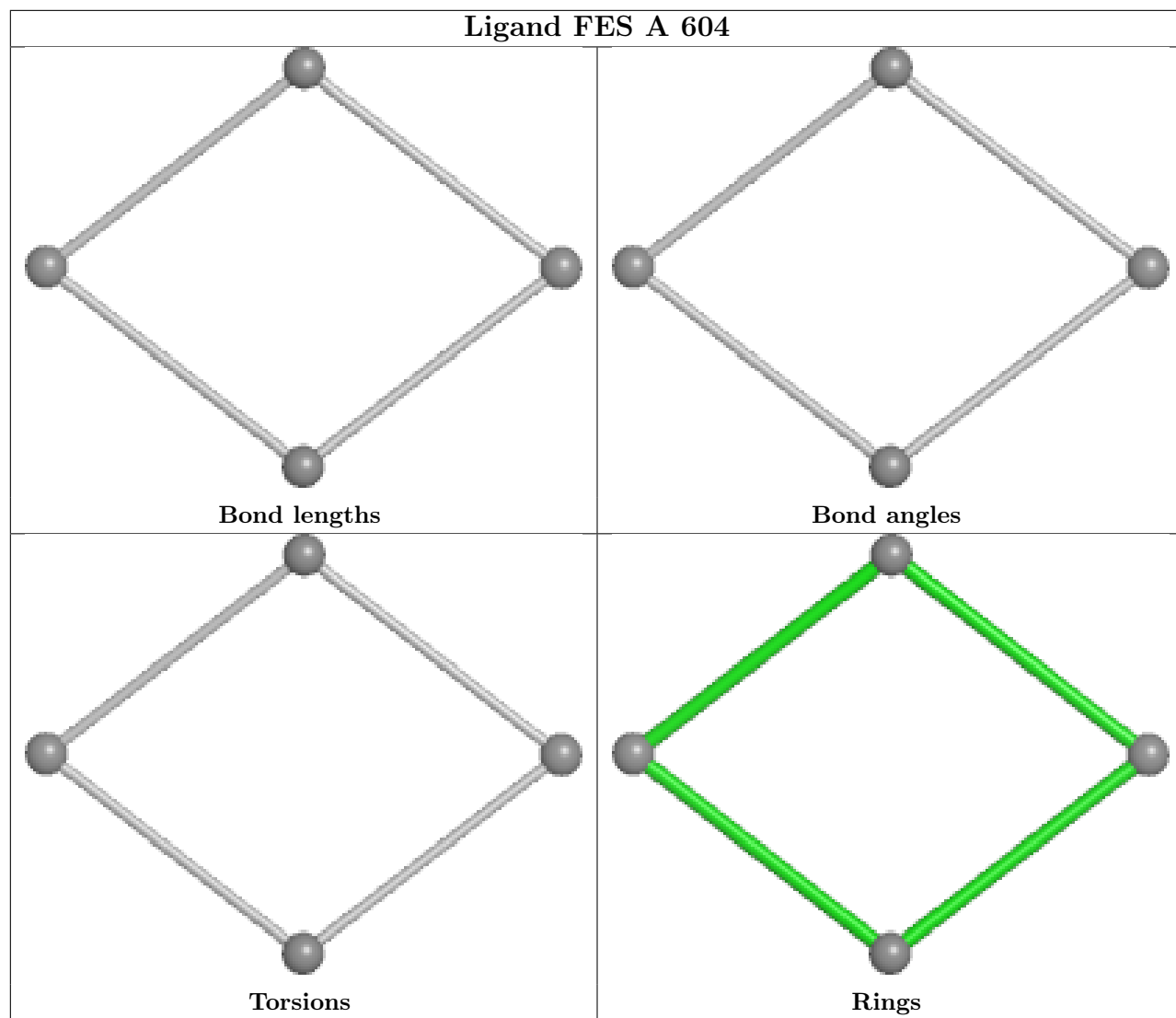


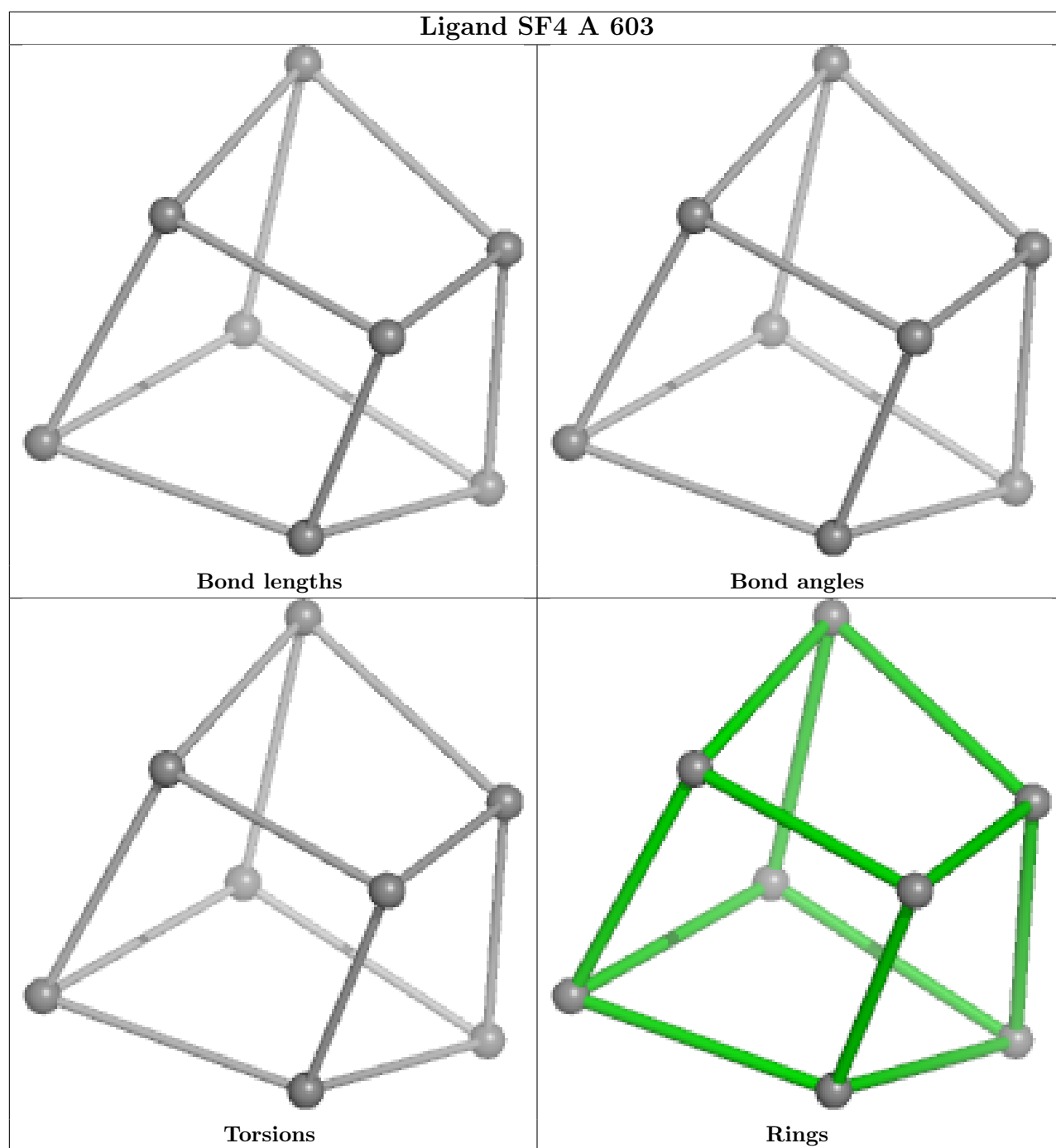












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

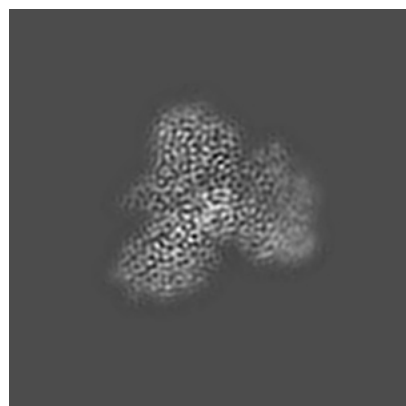
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-15166. These allow visual inspection of the internal detail of the map and identification of artifacts.

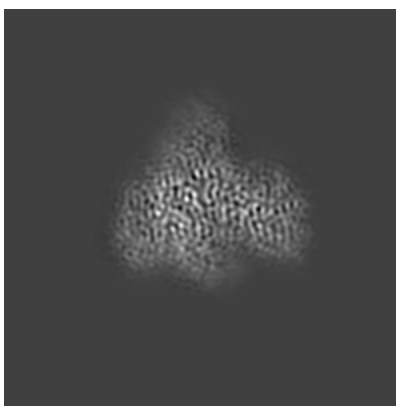
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

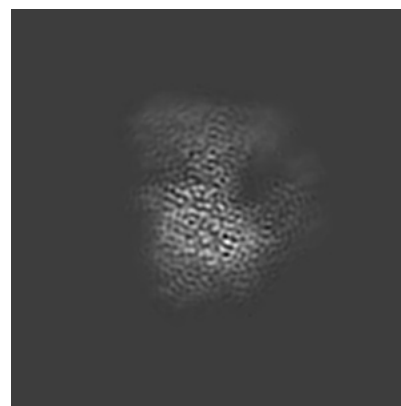
6.1.1 Primary map



X

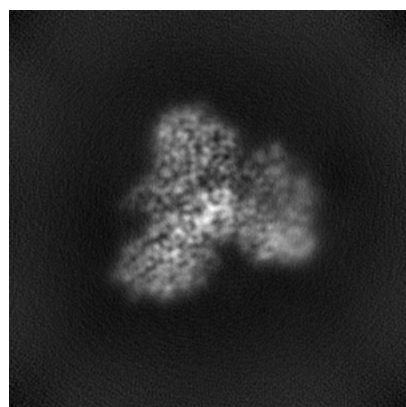


Y

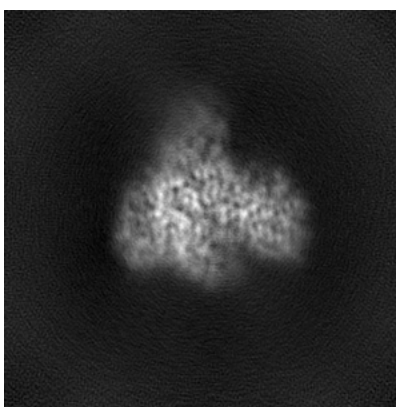


Z

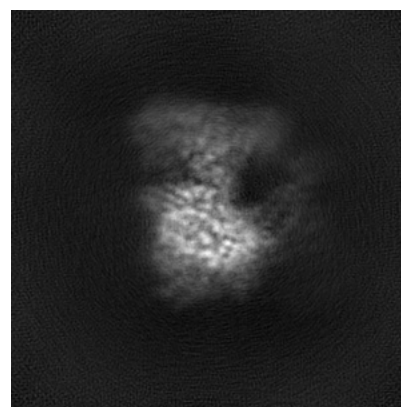
6.1.2 Raw map



X



Y

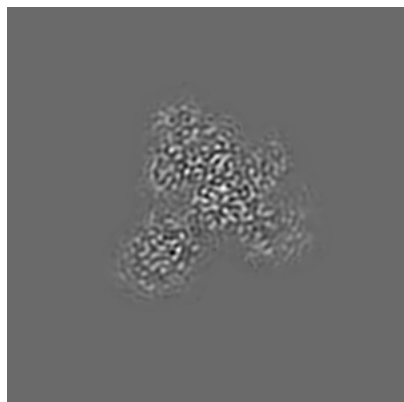


Z

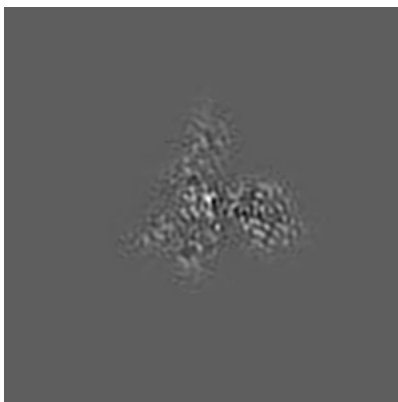
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

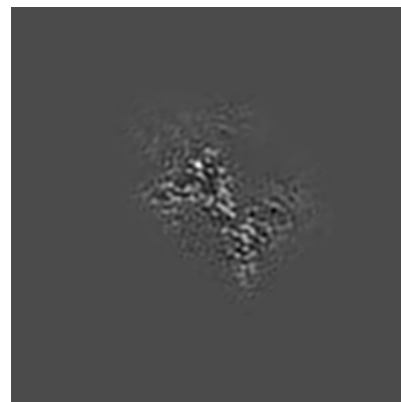
6.2.1 Primary map



X Index: 128

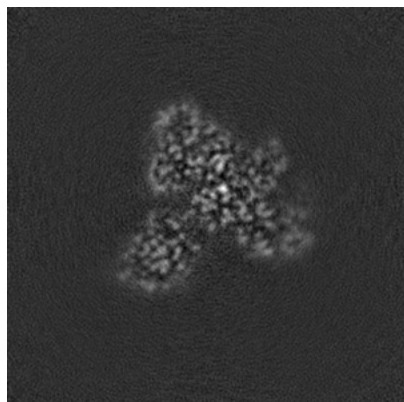


Y Index: 128

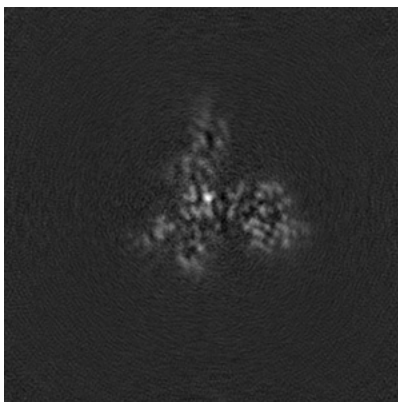


Z Index: 128

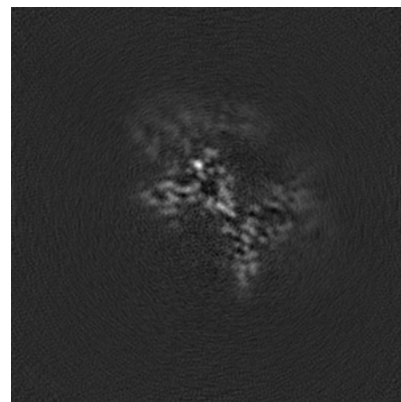
6.2.2 Raw map



X Index: 128



Y Index: 128

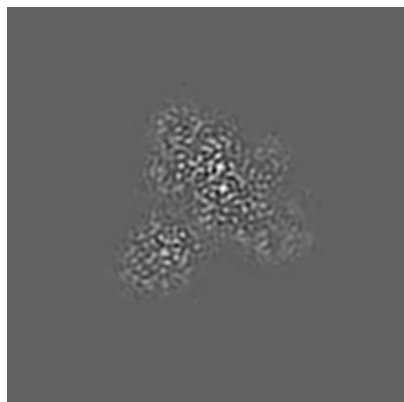


Z Index: 128

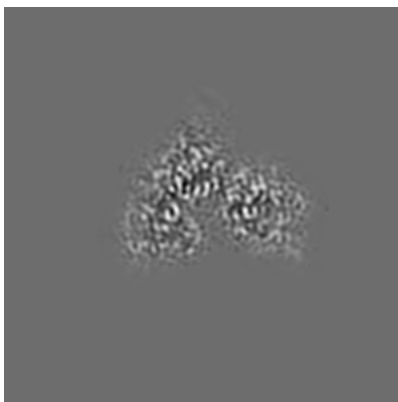
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

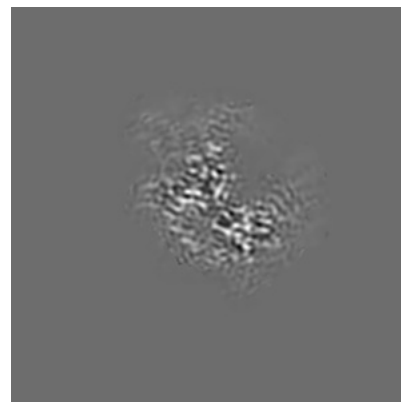
6.3.1 Primary map



X Index: 126

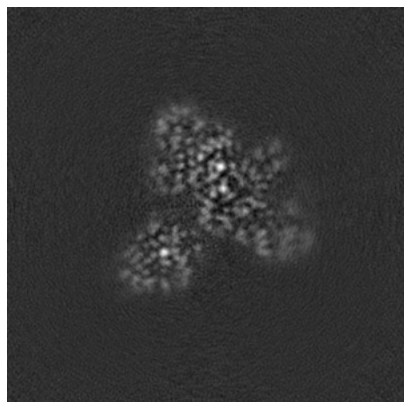


Y Index: 112

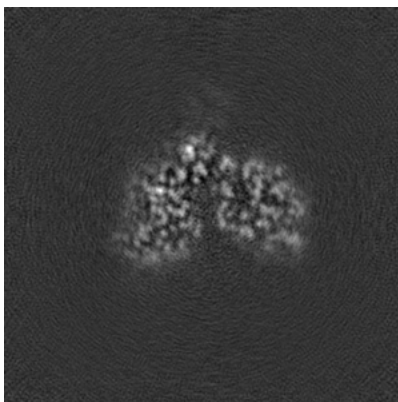


Z Index: 123

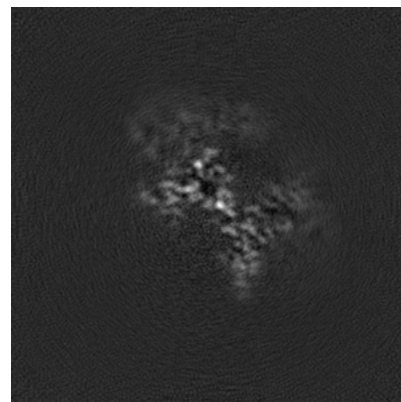
6.3.2 Raw map



X Index: 125



Y Index: 107

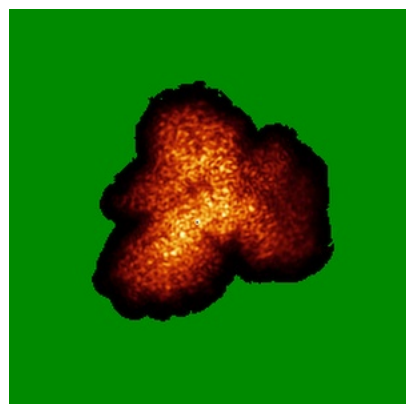


Z Index: 129

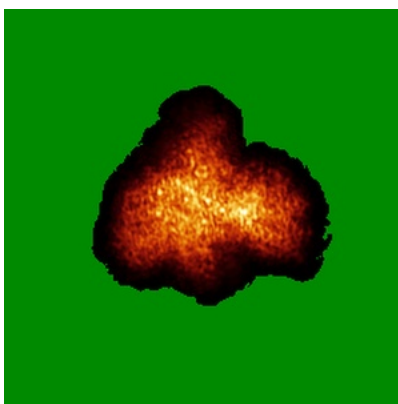
The images above show the largest variance slices of the map in three orthogonal directions.

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

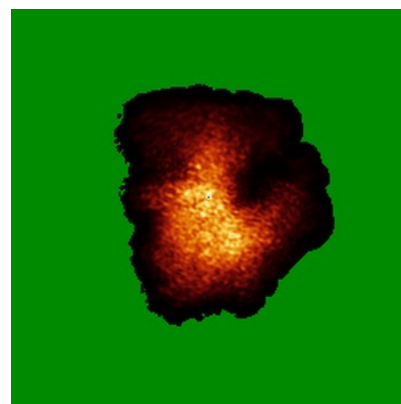
6.4.1 Primary map



X

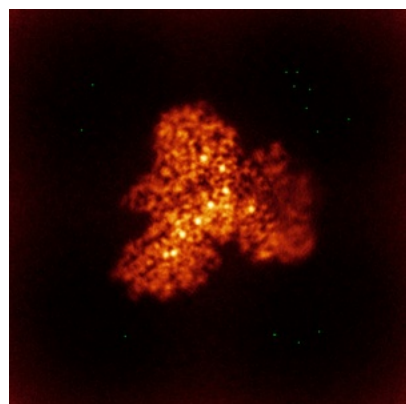


Y

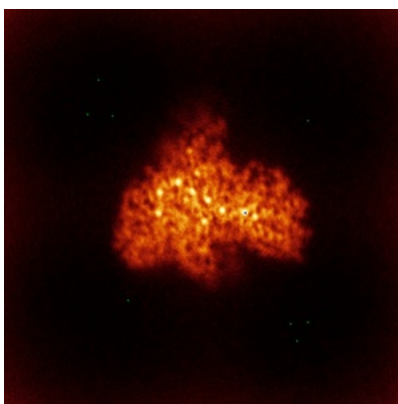


Z

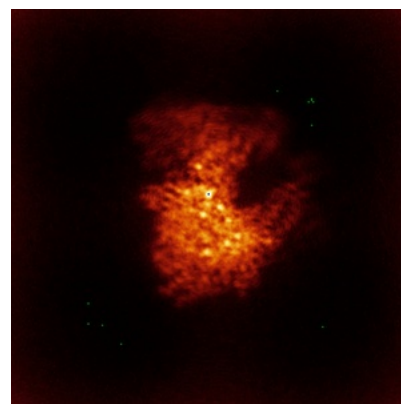
6.4.2 Raw map



X



Y

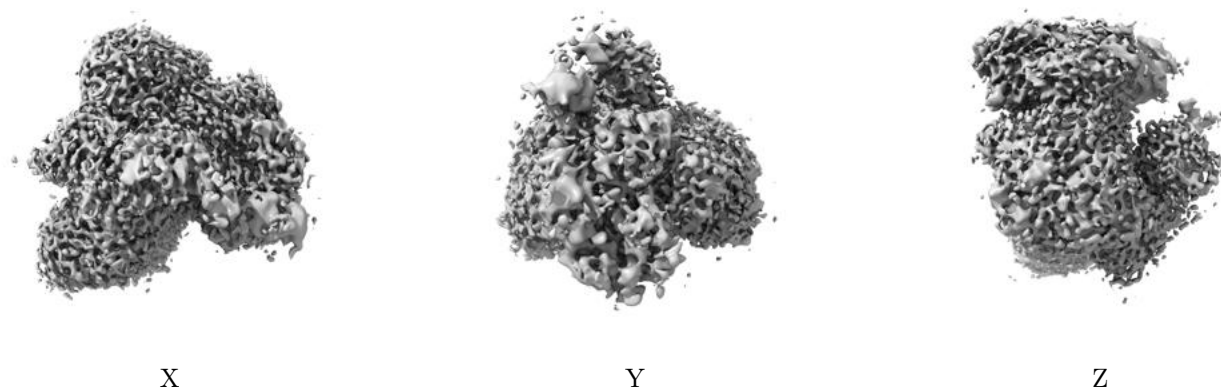


Z

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.

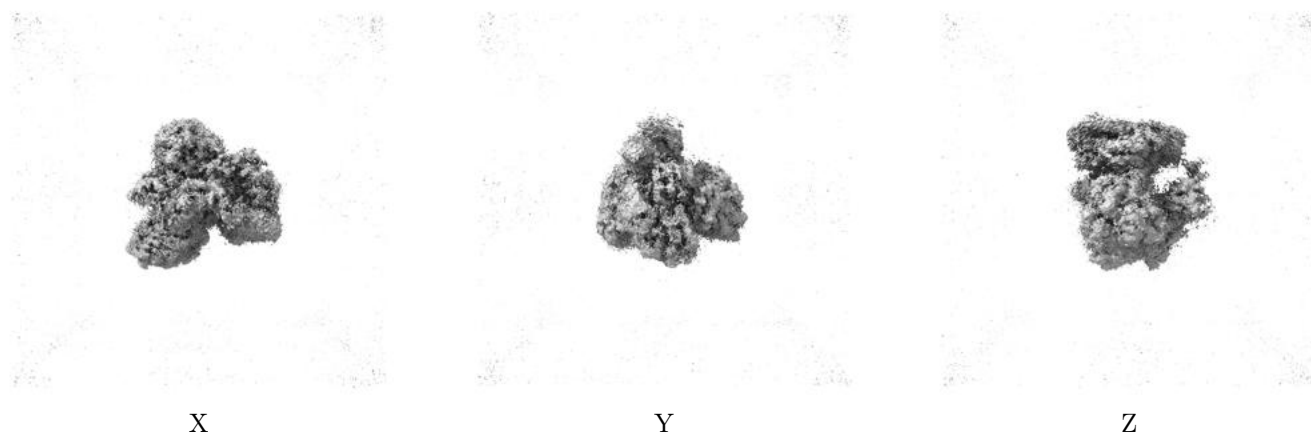
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.0534. 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.

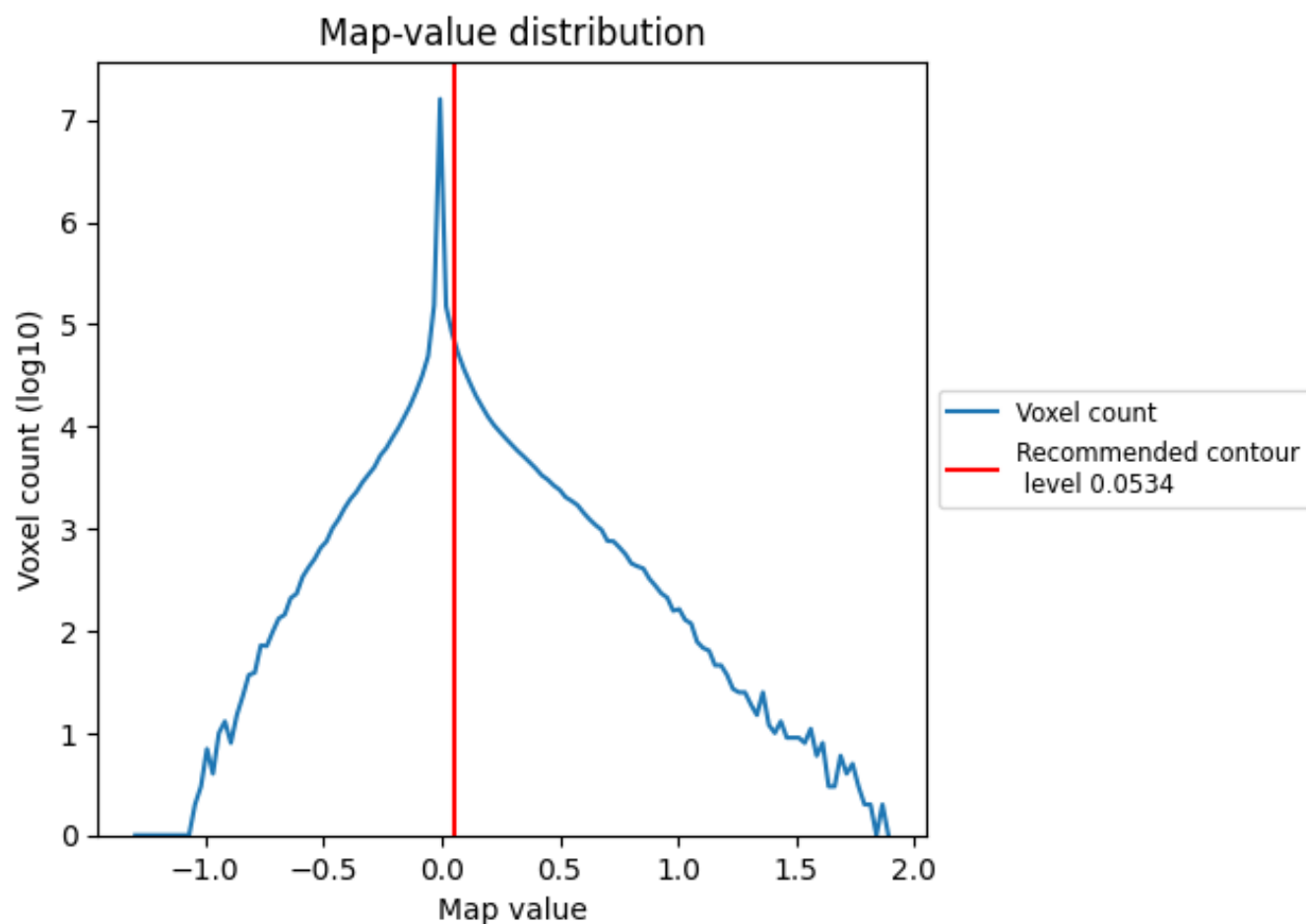
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

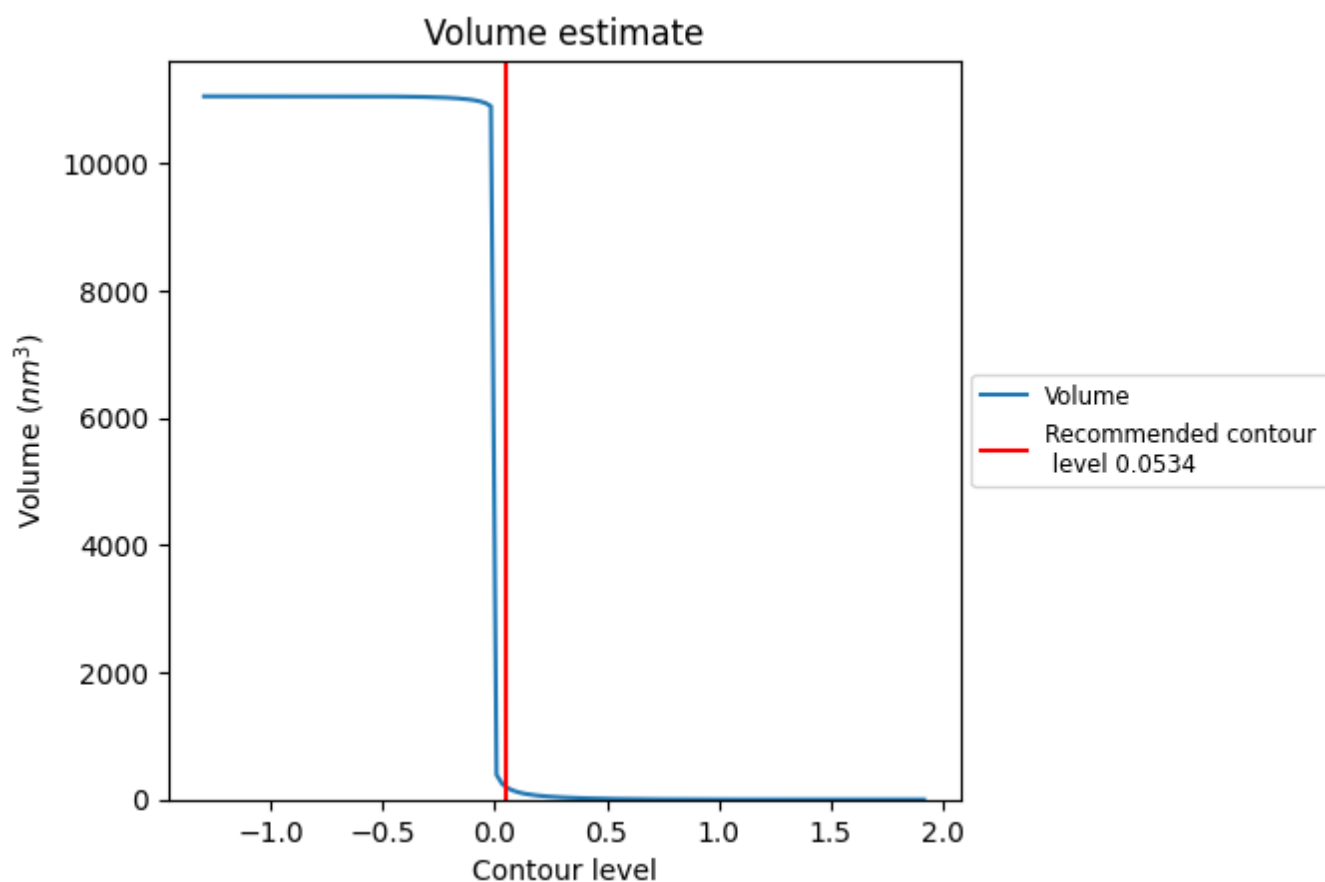
This section contains the results of statistical analysis of the map.

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.

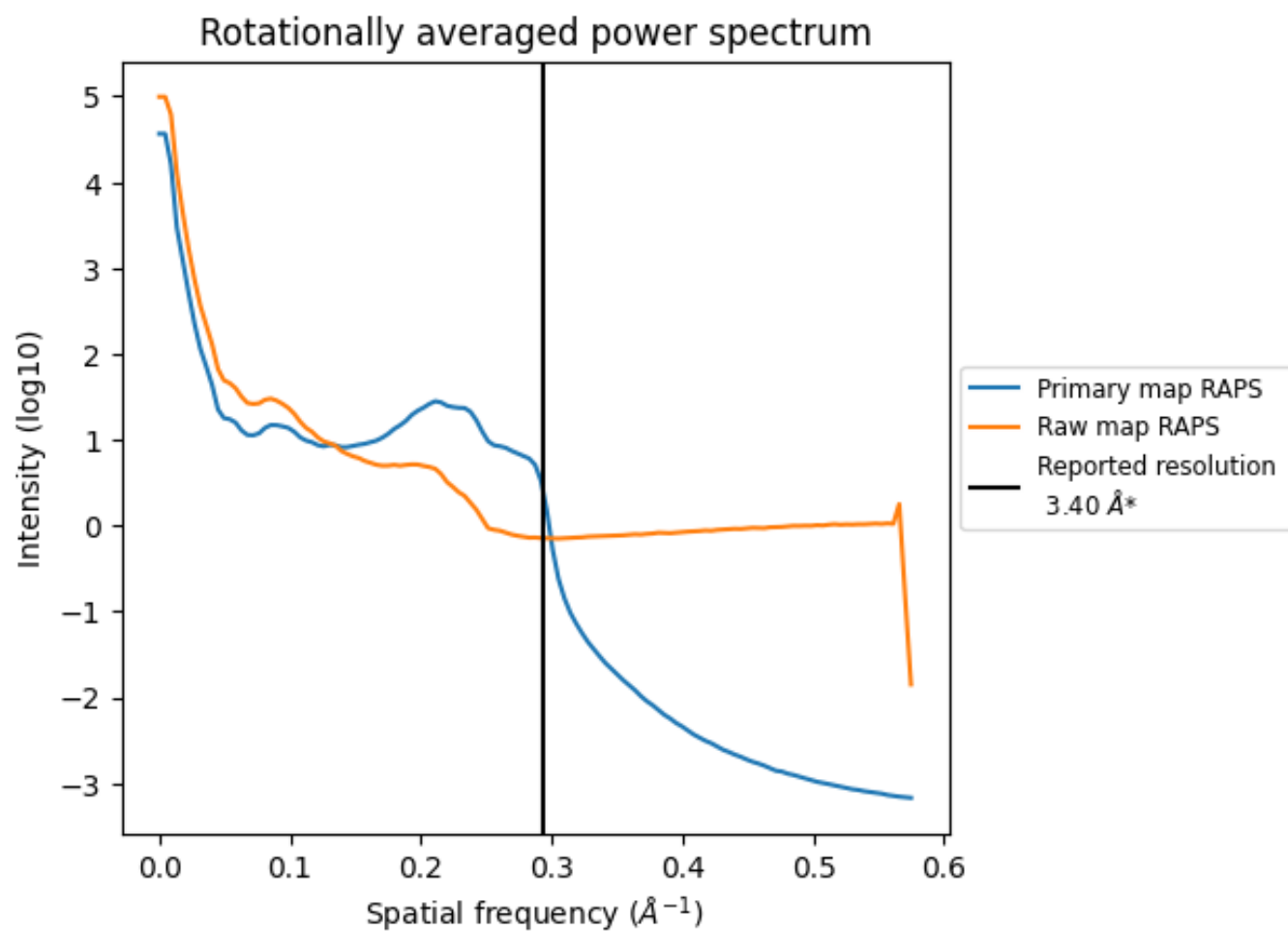
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 195 nm³; this corresponds to an approximate mass of 176 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 ⓘ

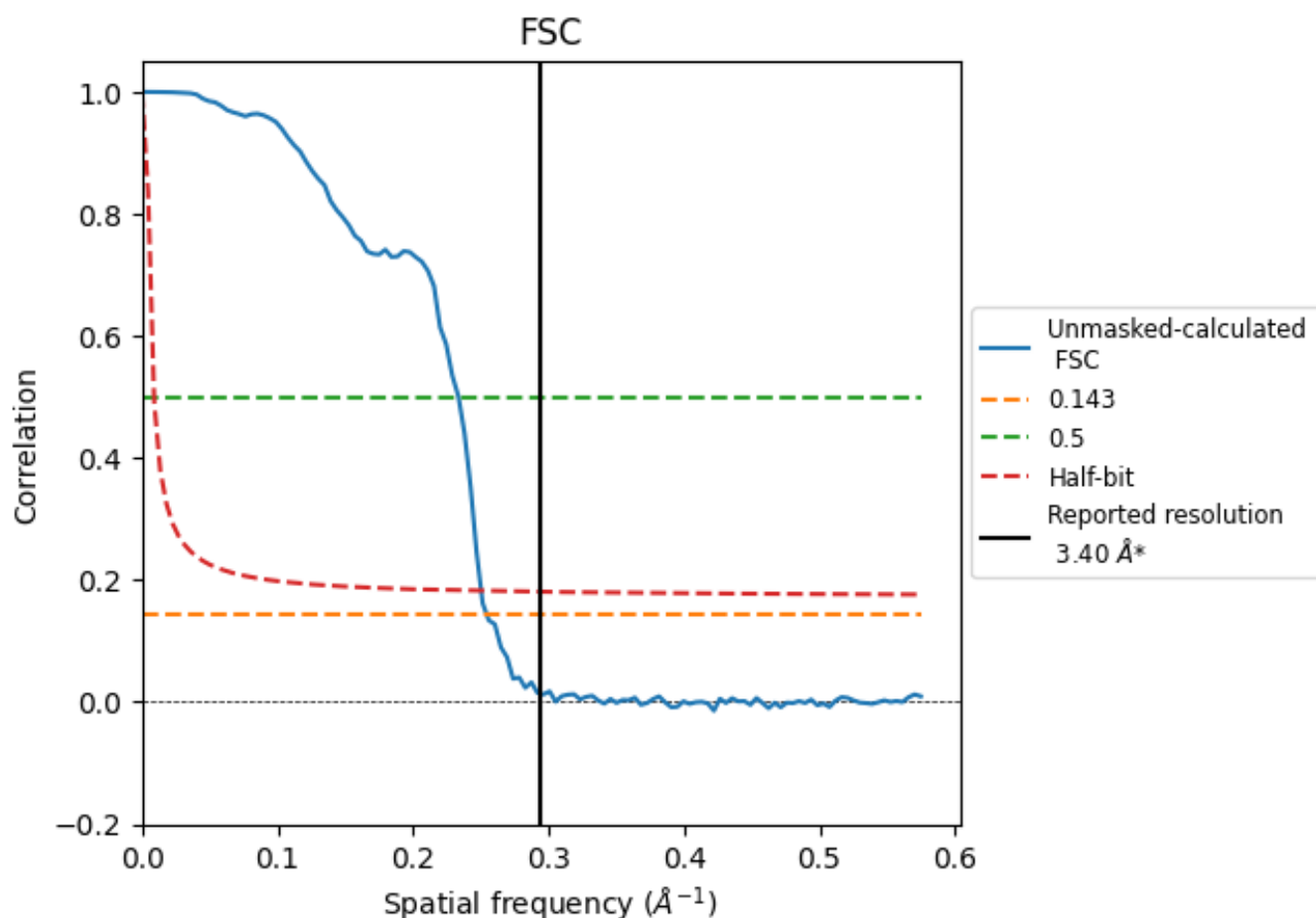


*Reported resolution corresponds to spatial frequency of 0.294 Å⁻¹

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 0.294 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

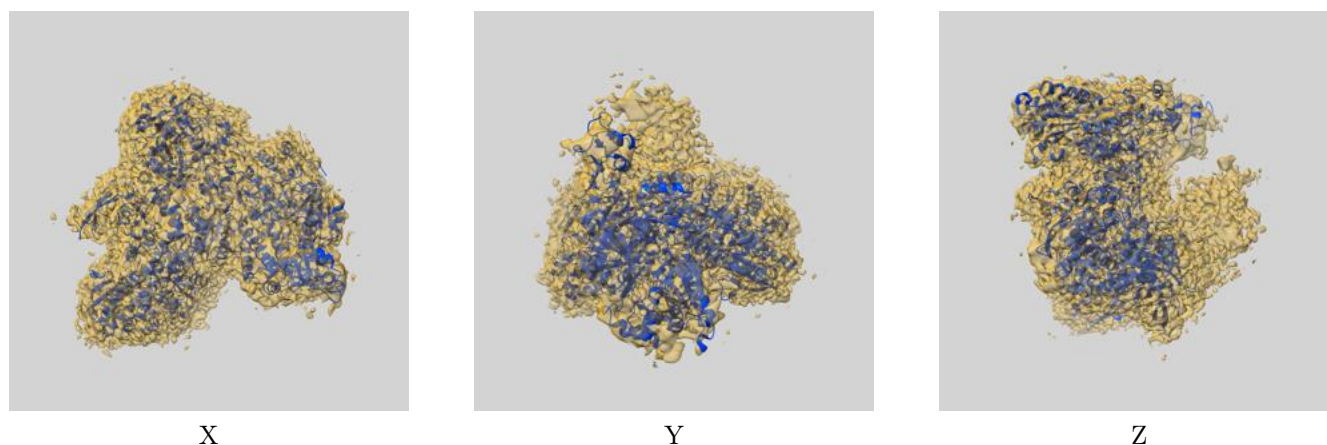
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.40	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.93	4.28	3.99

*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 3.93 differs from the reported value 3.4 by more than 10 %

9 Map-model fit [i](#)

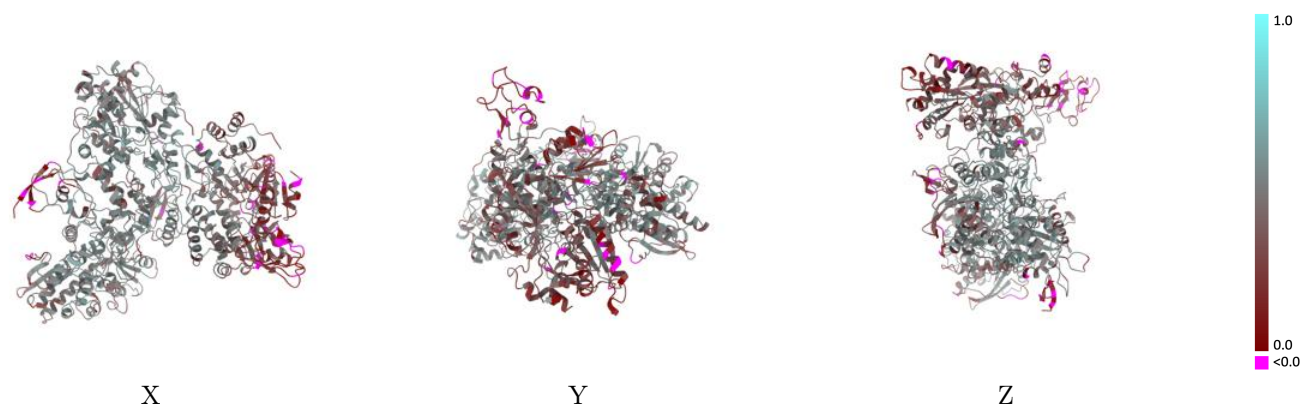
This section contains information regarding the fit between EMDB map EMD-15166 and PDB model 8A5E. Per-residue inclusion information can be found in section [3](#) on page [9](#).

9.1 Map-model overlay [i](#)



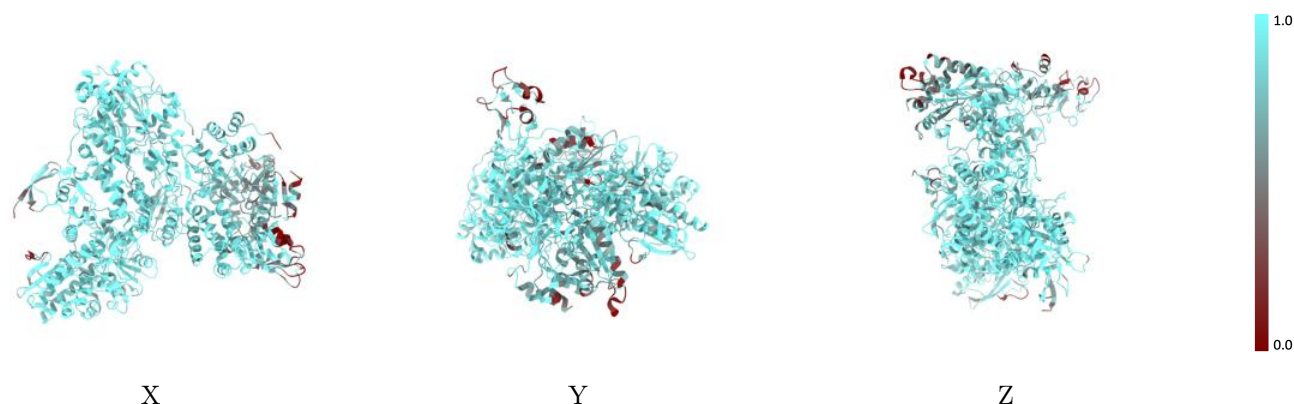
The images above show the 3D surface view of the map at the recommended contour level 0.0534 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



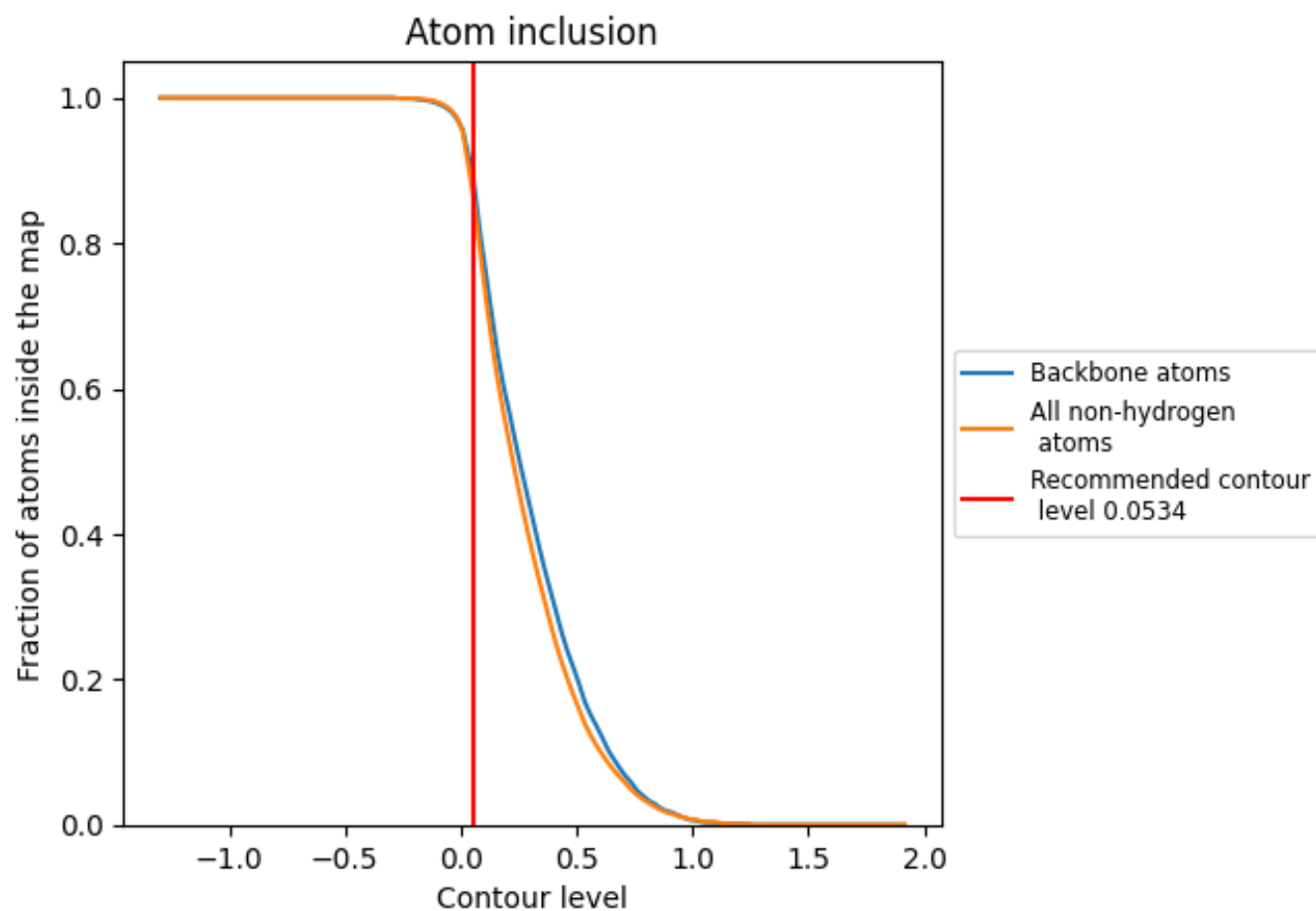
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.0534).

9.4 Atom inclusion [i](#)



At the recommended contour level, 89% of all backbone atoms, 87% 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 (0.0534) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8670	0.4090
A	0.9260	0.4630
B	0.7770	0.3190
C	0.7520	0.3290
D	0.9080	0.4450

