



## Full wwPDB EM Validation Report ⓘ

Nov 20, 2022 – 06:30 AM EST

PDB ID : 7M5Y  
EMDB ID : EMD-23685  
Title : human ATP13A2 in the outward-facing E2 state bound to spermine and magnesium fluoride  
Authors : Lee, K.P.K.  
Deposited on : 2021-03-25  
Resolution : 3.00 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](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 : 1.8.5 (274361), 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) : 2.31.2

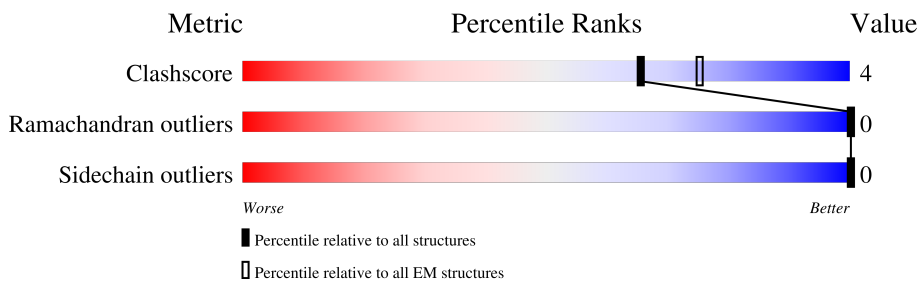
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.00 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	1189	

## 2 Entry composition

There are 13 unique types of molecules in this entry. The entry contains 16158 atoms, of which 8245 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 Polyamine-transporting ATPase 13A2.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
1	A	1000	14990	4818	7534	1262	1326	50	0	0

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1181	SER	-	expression tag	UNP Q9NQ11
A	1182	ASN	-	expression tag	UNP Q9NQ11
A	1183	SER	-	expression tag	UNP Q9NQ11
A	1184	LEU	-	expression tag	UNP Q9NQ11
A	1185	GLU	-	expression tag	UNP Q9NQ11
A	1186	VAL	-	expression tag	UNP Q9NQ11
A	1187	LEU	-	expression tag	UNP Q9NQ11
A	1188	PHE	-	expression tag	UNP Q9NQ11
A	1189	GLN	-	expression tag	UNP Q9NQ11

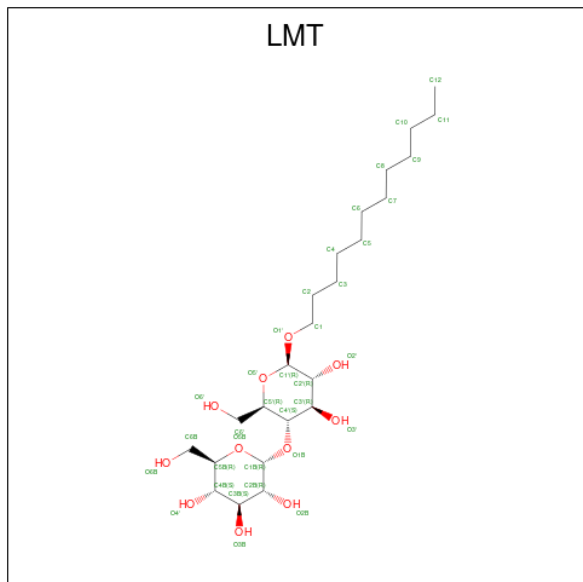
- Molecule 2 is MAGNESIUM ION (three-letter code: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
2	A	1	Total	Mg	0
			1	1	

- Molecule 3 is TETRAFLUOROMAGNESATE(2-) (three-letter code: MF4) (formula: F<sub>4</sub>Mg) (labeled as "Ligand of Interest" by depositor).

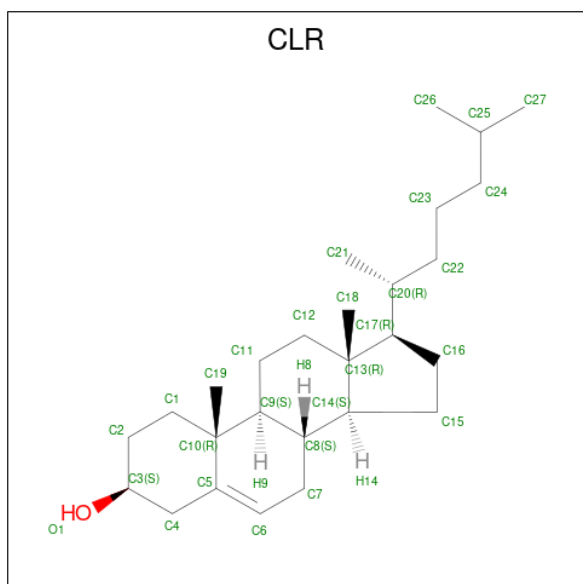


- Molecule 5 is DODECYL-BETA-D-MALTOSE (three-letter code: LMT) (formula:  $C_{24}H_{46}O_{11}$ ).



Mol	Chain	Residues	Atoms				AltConf
			Total	C	H	O	
5	A	1	74	24	39	11	0

- Molecule 6 is CHOLESTEROL (three-letter code: CLR) (formula:  $C_{27}H_{46}O$ ).



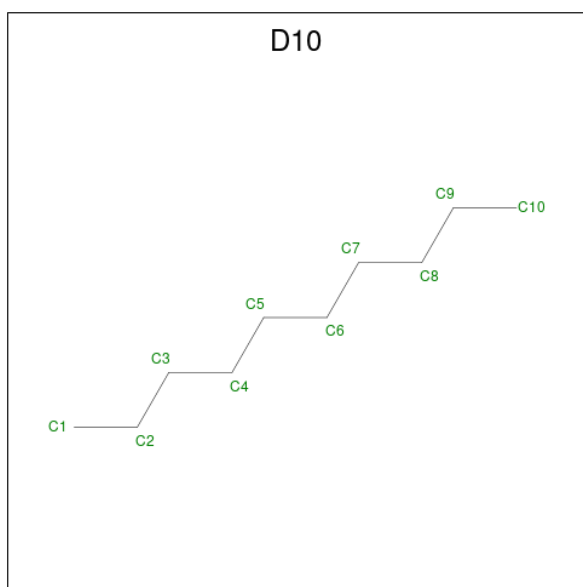
Mol	Chain	Residues	Atoms				AltConf
			Total	C	H	O	
6	A	1	296	108	184	4	0

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Mol	Chain	Residues	Atoms				AltConf
6	A	1	Total	C	H	O	0
			296	108	184	4	
6	A	1	Total	C	H	O	0
			296	108	184	4	
6	A	1	Total	C	H	O	0
			296	108	184	4	

- Molecule 7 is DECANE (three-letter code: D10) (formula: C<sub>10</sub>H<sub>22</sub>).



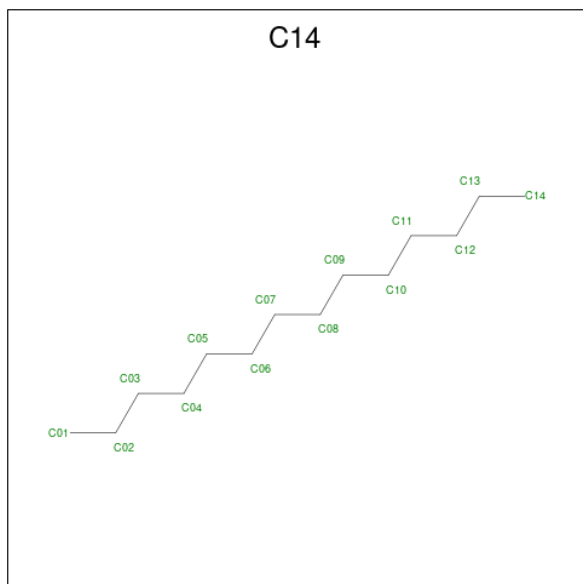
Mol	Chain	Residues	Atoms			AltConf
7	A	1	Total	C	H	0
			288	90	198	
7	A	1	Total	C	H	0
			288	90	198	
7	A	1	Total	C	H	0
			288	90	198	
7	A	1	Total	C	H	0
			288	90	198	
7	A	1	Total	C	H	0
			288	90	198	
7	A	1	Total	C	H	0
			288	90	198	
7	A	1	Total	C	H	0
			288	90	198	

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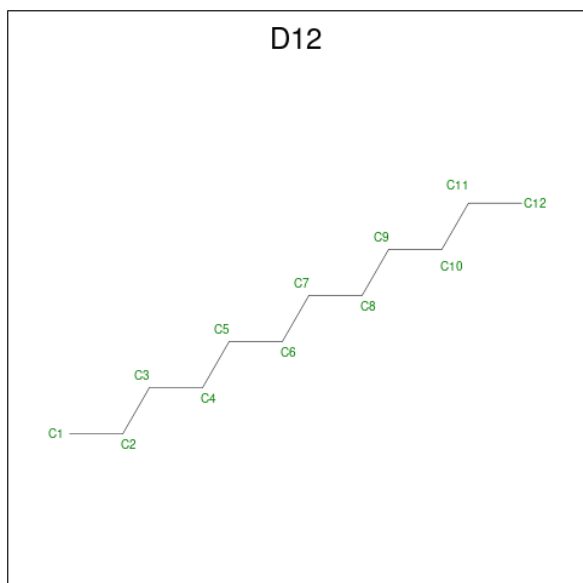
Mol	Chain	Residues	Atoms		AltConf
			Total	C H	
7	A	1	288	90 198	0

- Molecule 8 is TETRADECANE (three-letter code: C14) (formula:  $C_{14}H_{30}$ ).



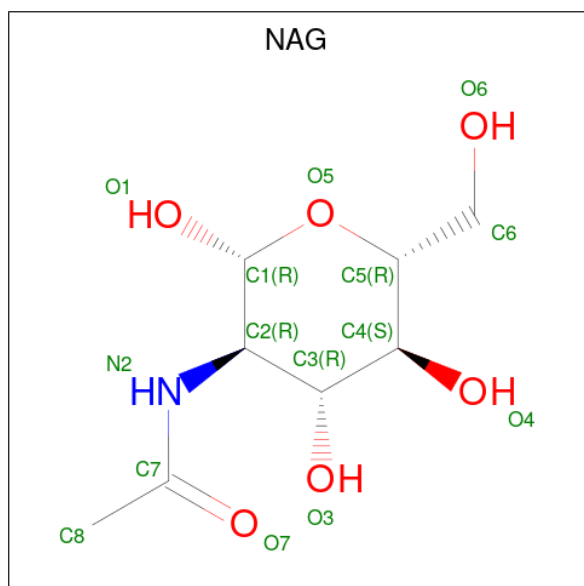
Mol	Chain	Residues	Atoms		AltConf
			Total	C H	
8	A	1	44	14 30	0

- Molecule 9 is DODECANE (three-letter code: D12) (formula:  $C_{12}H_{26}$ ).



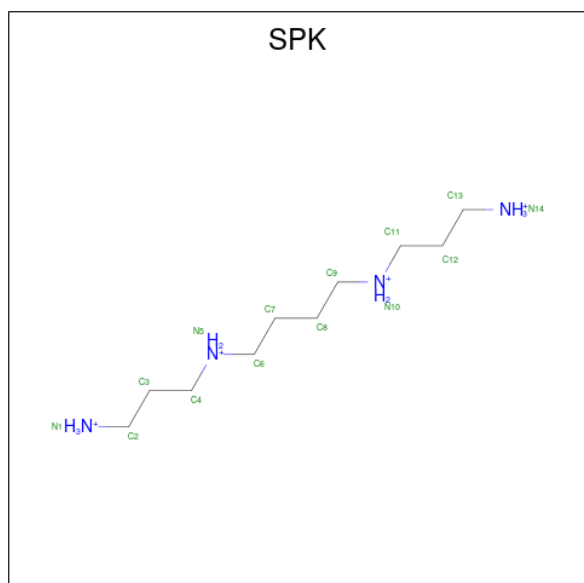
Mol	Chain	Residues	Atoms			AltConf
			Total	C	H	
9	A	1	38	12	26	0

- Molecule 10 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	H	N	O	
10	A	1	27	8	13	1	5	0

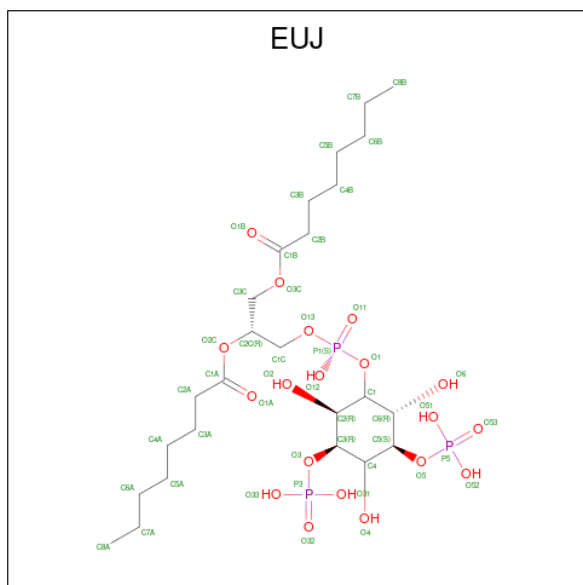
- Molecule 11 is SPERMINE (FULLY PROTONATED FORM) (three-letter code: SPK) (formula:  $C_{10}H_{30}N_4$ ) (labeled as "Ligand of Interest" by depositor).





Mol	Chain	Residues	Atoms				AltConf
			Total	C	H	N	
11	A	1	44	10	30	4	0

- Molecule 12 is (2R)-3-[[[(S)-hydroxy{[(1S,2R,3R,4S,5S,6R)-2,4,6-trihydroxy-3,5-bis(phosphonoxy)cyclohexyl]oxy}phosphoryl]oxy}propane-1,2-diyl dioctanoate (three-letter code: EUJ) (formula: C<sub>25</sub>H<sub>49</sub>O<sub>19</sub>P<sub>3</sub>) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	H	O	P	
12	A	1	91	25	44	19	3	0

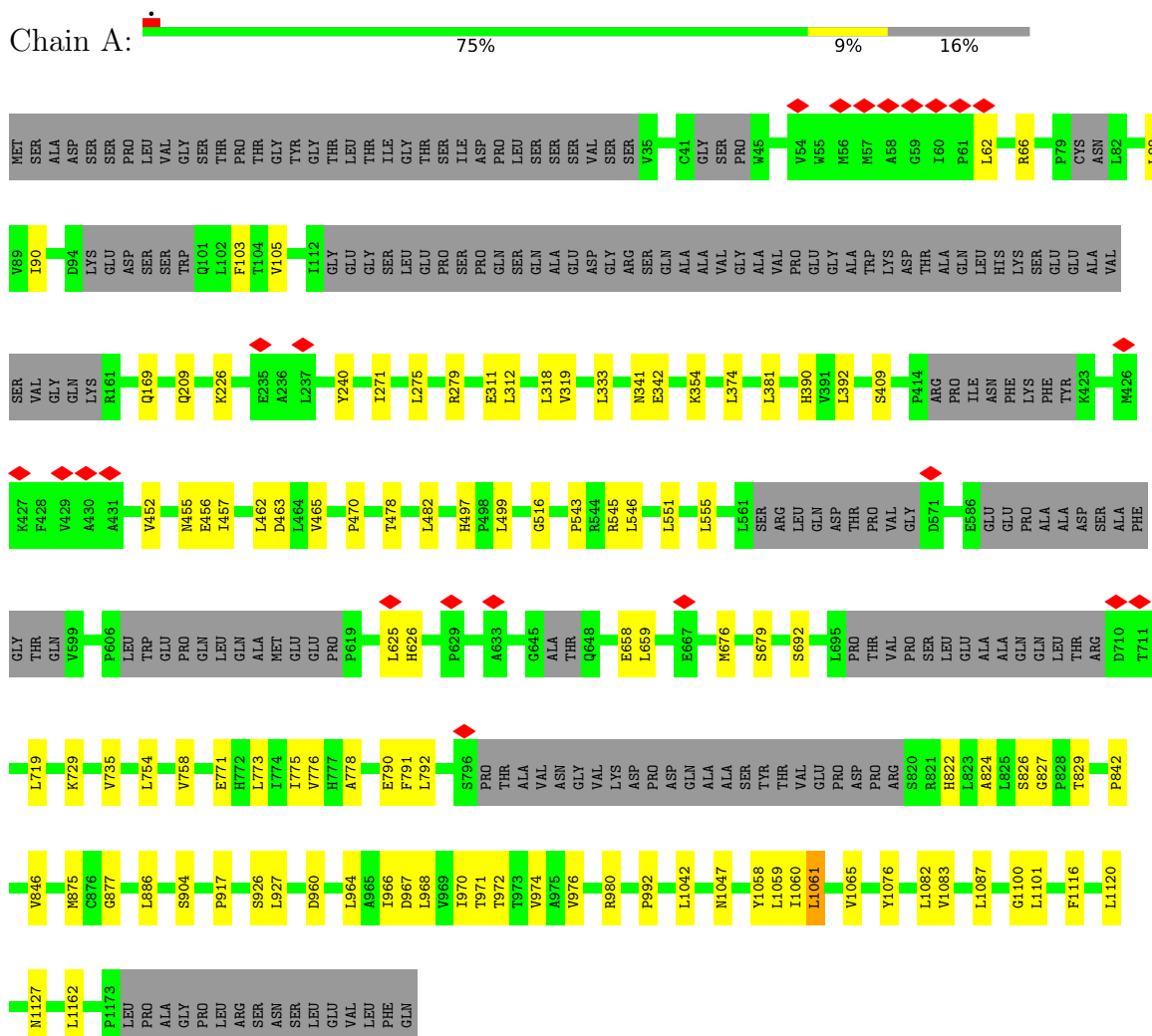
- Molecule 13 is water.

Mol	Chain	Residues	Atoms		AltConf
			Total	O	
13	A	8	8	8	0

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

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Polyamine-transporting ATPase 13A2



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	285797	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 ( $e^-/\text{\AA}^2$ )	65	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.810	Depositor
Minimum map value	-0.170	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.023	Depositor
Recommended contour level	0.2	Depositor
Map size (Å)	318.72, 318.72, 318.72	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.83, 0.83, 0.83	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: LMT, C14, NAG, SPK, EUJ, MF4, MG, Y01, CLR, D12, D10

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	0.29	0/7604	0.63	1/10375 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
1	A	1061	LEU	CB-CG-CD1	5.71	120.71	111.00

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	926	SER	Mainchain

### 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	7456	7534	7549	64	0
2	A	1	0	0	0	0
3	A	5	0	0	0	0
4	A	105	147	147	2	0
5	A	35	39	46	1	0
6	A	112	184	184	2	0
7	A	90	198	198	0	0
8	A	14	30	30	0	0
9	A	12	26	26	0	0
10	A	14	13	13	0	0
11	A	14	30	30	1	0
12	A	47	44	0	0	0
13	A	8	0	0	1	0
All	All	7913	8245	8223	66	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 4.

All (66) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:775:ILE:HD13	1:A:824:ALA:HB3	1.56	0.85
1:A:240:TYR:OH	1:A:470:PRO:O	2.02	0.78
1:A:478:THR:HG22	1:A:499:LEU:HD11	1.65	0.77
1:A:967:ASP:O	1:A:971:THR:OG1	2.06	0.72
6:A:1207:CLR:H183	6:A:1207:CLR:H212	1.74	0.69
1:A:226:LYS:O	1:A:279:ARG:NH1	2.26	0.68
1:A:462:LEU:O	1:A:465:VAL:HG12	1.95	0.66
1:A:875:MET:SD	1:A:877:GLY:N	2.69	0.65
1:A:886:LEU:HD13	1:A:904:SER:OG	1.98	0.64
1:A:980:ARG:NH1	4:A:1205:Y01:OAH	2.30	0.64
6:A:1220:CLR:H212	6:A:1220:CLR:H183	1.80	0.64
1:A:625:LEU:HD23	1:A:626:HIS:ND1	2.13	0.63
1:A:754:LEU:HD21	1:A:775:ILE:HD12	1.80	0.63
1:A:62:LEU:O	1:A:66:ARG:N	2.35	0.60
1:A:846:VAL:HG21	1:A:1162:LEU:HB3	1.84	0.59
1:A:463:ASP:OD2	13:A:1301:HOH:O	2.17	0.58
1:A:966:ILE:HD12	1:A:1058:TYR:CE2	2.40	0.57
1:A:319:VAL:HG13	1:A:390:HIS:ND1	2.20	0.56
1:A:516:GLY:O	1:A:729:LYS:NZ	2.29	0.55
1:A:342:GLU:OE2	1:A:354:LYS:NZ	2.34	0.54
1:A:551:LEU:O	1:A:555:LEU:HD23	2.08	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:842:PRO:O	1:A:846:VAL:HG23	2.09	0.53
1:A:497:HIS:ND1	5:A:1204:LMT:O3B	2.42	0.53
1:A:90:ILE:HD12	1:A:103:PHE:O	2.09	0.53
1:A:545:ARG:O	1:A:546:LEU:HD12	2.09	0.52
1:A:790:GLU:OE1	1:A:792:LEU:HD21	2.10	0.51
1:A:976:VAL:HG11	4:A:1205:Y01:HAD1	1.92	0.51
1:A:452:VAL:HG23	1:A:457:ILE:HG13	1.93	0.49
1:A:927:LEU:HD23	1:A:992:PRO:HG2	1.95	0.49
1:A:1076:TYR:HA	1:A:1082:LEU:HD11	1.94	0.49
1:A:658:GLU:HG2	1:A:659:LEU:HD22	1.96	0.48
1:A:209:GLN:NE2	1:A:311:GLU:O	2.47	0.48
1:A:846:VAL:HG21	1:A:1162:LEU:CB	2.44	0.47
1:A:778:ALA:CB	1:A:829:THR:HG23	2.45	0.47
1:A:826:SER:OG	1:A:827:GLY:N	2.48	0.47
1:A:390:HIS:HE1	1:A:392:LEU:HD21	1.80	0.46
1:A:455:ASN:OD1	1:A:456:GLU:N	2.46	0.46
1:A:970:ILE:O	1:A:974:VAL:HG22	2.15	0.46
1:A:972:THR:O	1:A:976:VAL:HG12	2.16	0.45
1:A:692:SER:OG	1:A:719:LEU:HD21	2.16	0.45
1:A:771:GLU:OE1	1:A:822:HIS:NE2	2.48	0.45
1:A:776:VAL:HG12	1:A:791:PHE:HD1	1.82	0.45
1:A:543:PRO:O	1:A:546:LEU:HD13	2.17	0.44
1:A:758:VAL:HG23	1:A:773:LEU:HD21	1.98	0.44
1:A:970:ILE:HD12	1:A:1059:LEU:HD21	1.99	0.44
1:A:1083:VAL:O	1:A:1087:LEU:HD23	2.17	0.44
1:A:271:ILE:O	1:A:275:LEU:HD23	2.18	0.43
1:A:964:LEU:HG	1:A:968:LEU:HD12	2.01	0.43
1:A:312:LEU:HD22	1:A:318:LEU:HD11	2.01	0.43
1:A:390:HIS:CE1	1:A:392:LEU:HD21	2.53	0.42
1:A:88:LEU:HD12	1:A:105:VAL:O	2.18	0.42
1:A:478:THR:O	1:A:482:LEU:HD13	2.19	0.42
1:A:1042:LEU:HD22	1:A:1047:ASN:HD22	1.85	0.42
1:A:169:GLN:O	1:A:409:SER:OG	2.38	0.41
1:A:676:MET:O	1:A:679:SER:OG	2.32	0.41
1:A:692:SER:HB3	1:A:719:LEU:HD11	2.00	0.41
1:A:735:VAL:HG13	1:A:917:PRO:HG3	2.03	0.41
1:A:1100:GLY:O	1:A:1101:LEU:HD22	2.19	0.41
1:A:341:ASN:HB2	1:A:381:LEU:HD21	2.03	0.41
1:A:960:ASP:OD1	11:A:1223:SPK:N10	2.52	0.41
1:A:1061:LEU:O	1:A:1065:VAL:HG22	2.20	0.41
1:A:778:ALA:HB3	1:A:829:THR:HG23	2.04	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1116:PHE:CE2	1:A:1120:LEU:HD11	2.55	0.40
1:A:311:GLU:N	1:A:311:GLU:OE1	2.54	0.40
1:A:1060:ILE:HG21	1:A:1127:ASN:OD1	2.20	0.40
1:A:333:LEU:HG	1:A:374:LEU:HD23	2.03	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	976/1189 (82%)	926 (95%)	50 (5%)	0	100   100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	794/1011 (78%)	794 (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 (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1047	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

### 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

### 5.6 Ligand geometry [i](#)

Of 24 ligands modelled in this entry, 1 is monoatomic - leaving 23 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$
7	D10	A	1210	-	9,9,9	0.28	0	8,8,8	0.49	0
10	NAG	A	1222	1	14,14,15	2.14	2 (14%)	17,19,21	1.61	5 (29%)
6	CLR	A	1221	-	31,31,31	0.66	0	48,48,48	1.24	5 (10%)
12	EUJ	A	1224	-	47,47,47	0.60	0	61,65,65	1.08	7 (11%)
6	CLR	A	1206	-	31,31,31	0.65	1 (3%)	48,48,48	1.28	6 (12%)
7	D10	A	1217	-	9,9,9	0.25	0	8,8,8	0.56	0
5	LMT	A	1204	-	36,36,36	1.07	3 (8%)	47,47,47	1.58	11 (23%)
6	CLR	A	1220	-	31,31,31	0.61	0	48,48,48	1.38	8 (16%)
7	D10	A	1211	-	9,9,9	0.26	0	8,8,8	0.56	0
7	D10	A	1212	-	9,9,9	0.30	0	8,8,8	0.45	0
11	SPK	A	1223	-	13,13,13	0.79	0	12,12,12	1.81	4 (33%)
4	Y01	A	1203	-	38,38,38	1.20	2 (5%)	57,57,57	1.87	11 (19%)



Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
7	D10	A	1218	-	9,9,9	0.26	0	8,8,8	0.59	0
8	C14	A	1215	-	13,13,13	0.30	0	12,12,12	0.72	0
7	D10	A	1219	-	9,9,9	0.23	0	8,8,8	0.51	0
6	CLR	A	1207	-	31,31,31	0.43	0	48,48,48	0.72	0
7	D10	A	1213	-	9,9,9	0.23	0	8,8,8	0.56	0
9	D12	A	1216	-	11,11,11	0.27	0	10,10,10	0.65	0
7	D10	A	1214	-	9,9,9	0.31	0	8,8,8	0.52	0
7	D10	A	1209	-	9,9,9	0.26	0	8,8,8	0.54	0
4	Y01	A	1205	-	38,38,38	1.19	3 (7%)	57,57,57	1.77	9 (15%)
3	MF4	A	1202	1	0,4,4	-	-	-	-	-
4	Y01	A	1208	-	38,38,38	1.24	3 (7%)	57,57,57	2.03	13 (22%)

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
7	D10	A	1210	-	-	4/7/7/7	-
10	NAG	A	1222	1	-	1/6/23/26	0/1/1/1
6	CLR	A	1221	-	-	1/10/68/68	0/4/4/4
12	EUJ	A	1224	-	-	19/44/68/68	0/1/1/1
6	CLR	A	1206	-	-	6/10/68/68	0/4/4/4
7	D10	A	1217	-	-	2/7/7/7	-
5	LMT	A	1204	-	-	9/21/61/61	0/2/2/2
6	CLR	A	1220	-	-	3/10/68/68	0/4/4/4
7	D10	A	1211	-	-	0/7/7/7	-
7	D10	A	1212	-	-	3/7/7/7	-
11	SPK	A	1223	-	-	1/11/11/11	-
4	Y01	A	1203	-	-	6/19/77/77	0/4/4/4
7	D10	A	1218	-	-	1/7/7/7	-
8	C14	A	1215	-	-	3/11/11/11	-
7	D10	A	1219	-	-	2/7/7/7	-
6	CLR	A	1207	-	-	4/10/68/68	0/4/4/4
7	D10	A	1213	-	-	1/7/7/7	-
9	D12	A	1216	-	-	4/9/9/9	-
7	D10	A	1214	-	-	2/7/7/7	-
7	D10	A	1209	-	-	2/7/7/7	-
4	Y01	A	1205	-	-	6/19/77/77	0/4/4/4

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	Y01	A	1208	-	-	6/19/77/77	0/4/4/4

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	A	1222	NAG	C1-C2	6.37	1.61	1.52
4	A	1203	Y01	CAK-CAI	-4.21	1.41	1.50
4	A	1208	Y01	CAK-CAI	-4.13	1.41	1.50
4	A	1205	Y01	CAK-CAI	-4.00	1.41	1.50
4	A	1208	Y01	CAI-CAZ	2.73	1.39	1.33
4	A	1205	Y01	CAI-CAZ	2.72	1.39	1.33
6	A	1206	CLR	C16-C17	2.66	1.59	1.54
4	A	1203	Y01	CAI-CAZ	2.65	1.38	1.33
10	A	1222	NAG	C3-C2	2.57	1.58	1.52
5	A	1204	LMT	O3'-C3'	-2.35	1.37	1.43
4	A	1208	Y01	CAL-CAX	2.35	1.56	1.50
5	A	1204	LMT	O2B-C2B	-2.24	1.37	1.43
5	A	1204	LMT	O4'-C4B	-2.21	1.37	1.43
4	A	1205	Y01	CBH-CAZ	-2.20	1.48	1.52

All (79) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	1208	Y01	CAV-CAZ-CBH	7.13	125.89	116.42
4	A	1205	Y01	CAV-CAZ-CBH	6.95	125.65	116.42
4	A	1203	Y01	CAV-CAZ-CBH	6.93	125.63	116.42
4	A	1208	Y01	OAW-CAY-CAM	5.63	123.64	111.50
4	A	1205	Y01	OAW-CAY-CAM	5.13	122.55	111.50
4	A	1208	Y01	OAW-CAY-OAG	-5.07	111.45	123.70
4	A	1203	Y01	OAW-CAY-CAM	4.99	122.27	111.50
4	A	1203	Y01	OAW-CAY-OAG	-4.62	112.54	123.70
4	A	1208	Y01	CAV-CAZ-CAI	-4.33	114.38	120.61
4	A	1205	Y01	OAW-CAY-OAG	-4.27	113.37	123.70
4	A	1203	Y01	CAV-CAZ-CAI	-4.05	114.77	120.61
6	A	1206	CLR	C16-C17-C13	-3.99	99.03	103.84
6	A	1220	CLR	C1-C10-C9	3.99	114.30	108.73
5	A	1204	LMT	O1'-C1'-C2'	-3.93	102.17	108.30
4	A	1208	Y01	CBF-CBD-CBG	3.79	114.17	109.09
4	A	1205	Y01	CAV-CAZ-CAI	-3.69	115.29	120.61
12	A	1224	EUJ	C4-C3-C2	3.61	116.06	110.85
12	A	1224	EUJ	O3-C3-C4	-3.38	100.80	108.66
5	A	1204	LMT	C6B-C5B-C4B	-3.34	105.18	113.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	1204	LMT	C4B-C3B-C2B	-3.25	105.14	110.82
10	A	1222	NAG	O3-C3-C2	-3.15	102.94	109.47
6	A	1221	CLR	C10-C9-C8	-3.09	108.10	112.73
4	A	1208	Y01	CAS-CBF-CBH	3.01	117.04	113.08
5	A	1204	LMT	C3'-C4'-C5'	-3.00	104.05	110.93
12	A	1224	EUJ	C5-C6-C1	2.99	115.16	108.96
6	A	1220	CLR	C10-C9-C8	-2.91	108.36	112.73
4	A	1208	Y01	CBH-CBF-CBD	-2.91	108.37	112.73
6	A	1220	CLR	C3-C4-C5	2.83	116.82	112.03
11	A	1223	SPK	C8-C9-N10	-2.82	104.54	112.14
6	A	1221	CLR	C11-C9-C8	2.79	115.78	111.75
6	A	1221	CLR	C15-C14-C13	2.77	107.19	103.84
6	A	1206	CLR	C16-C17-C20	2.77	116.44	112.15
6	A	1206	CLR	C1-C10-C9	2.77	112.60	108.73
6	A	1220	CLR	C15-C14-C13	2.72	107.12	103.84
11	A	1223	SPK	C7-C6-N5	-2.70	104.85	112.14
6	A	1221	CLR	C17-C13-C14	2.67	103.24	100.07
6	A	1206	CLR	C14-C8-C9	2.66	112.65	109.09
5	A	1204	LMT	C1'-C2'-C3'	-2.63	104.53	110.00
11	A	1223	SPK	C12-C11-N10	-2.62	105.08	112.14
4	A	1205	Y01	OAW-CBC-CAV	-2.61	102.79	108.12
5	A	1204	LMT	O3'-C3'-C2'	-2.56	104.44	110.35
4	A	1208	Y01	OAW-CBC-CAV	-2.55	102.91	108.12
10	A	1222	NAG	C2-N2-C7	-2.53	119.30	122.90
4	A	1205	Y01	CBH-CAZ-CAI	-2.52	119.05	122.90
6	A	1220	CLR	C9-C10-C5	-2.51	105.71	109.65
4	A	1203	Y01	OAW-CBC-CAV	-2.47	103.06	108.12
5	A	1204	LMT	O4'-C4B-C3B	-2.46	104.66	110.35
6	A	1221	CLR	C3-C4-C5	2.43	116.15	112.03
5	A	1204	LMT	C6'-C5'-C4'	-2.43	106.25	113.33
4	A	1203	Y01	CAD-CBH-CBF	2.41	114.55	111.68
4	A	1203	Y01	OAW-CBC-CAR	2.37	114.05	108.33
4	A	1208	Y01	CAK-CBD-CBF	-2.36	106.85	109.71
4	A	1208	Y01	CAP-CBE-CBI	-2.33	101.04	103.84
5	A	1204	LMT	O5'-C1'-O1'	-2.30	104.53	109.97
12	A	1224	EUJ	O2C-C1A-C2A	2.29	116.44	111.50
4	A	1208	Y01	OAF-CAX-CAL	-2.28	115.77	123.08
6	A	1206	CLR	C10-C9-C8	-2.25	109.36	112.73
6	A	1220	CLR	C1-C2-C3	2.24	113.35	110.47
4	A	1203	Y01	CAS-CBF-CBH	2.21	115.99	113.08
4	A	1205	Y01	OAW-CBC-CAR	2.20	113.65	108.33
12	A	1224	EUJ	C3-C2-C1	2.19	113.52	108.96

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	1204	LMT	C1'-O5'-C5'	2.18	117.96	113.69
4	A	1208	Y01	CAD-CBH-CBF	2.17	114.27	111.68
4	A	1203	Y01	CBH-CAZ-CAI	-2.16	119.60	122.90
10	A	1222	NAG	C6-C5-C4	-2.16	107.94	113.00
6	A	1206	CLR	C17-C13-C14	2.15	102.62	100.07
11	A	1223	SPK	C7-C8-C9	-2.15	103.36	113.56
4	A	1203	Y01	OAF-CAX-CAL	-2.14	116.21	123.08
10	A	1222	NAG	O4-C4-C3	-2.14	105.41	110.35
6	A	1220	CLR	C11-C12-C13	-2.13	109.13	112.78
4	A	1205	Y01	CAP-CBE-CBI	-2.12	101.29	103.84
12	A	1224	EUJ	C5-C4-C3	2.11	113.35	108.96
5	A	1204	LMT	O3B-C3B-C2B	-2.10	105.48	110.35
4	A	1205	Y01	CAD-CBH-CBF	2.10	114.19	111.68
4	A	1203	Y01	CAP-CAQ-CBG	-2.10	100.97	105.13
4	A	1208	Y01	CBH-CAZ-CAI	-2.09	119.71	122.90
12	A	1224	EUJ	C6-C5-C4	2.08	113.85	110.85
6	A	1220	CLR	C11-C9-C10	2.04	115.76	113.08
10	A	1222	NAG	O5-C5-C4	2.03	115.77	110.83

There are no chirality outliers.

All (86) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	1208	Y01	CAM-CAY-OAW-CBC
12	A	1224	EUJ	C1-O1-P1-O13
12	A	1224	EUJ	C5-O5-P5-O53
12	A	1224	EUJ	C1C-O13-P1-O11
5	A	1204	LMT	O5B-C1B-O1B-C4'
4	A	1208	Y01	OAG-CAY-OAW-CBC
5	A	1204	LMT	C2B-C1B-O1B-C4'
12	A	1224	EUJ	O1A-C1A-O2C-C2C
5	A	1204	LMT	O5'-C5'-C6'-O6'
12	A	1224	EUJ	C2A-C1A-O2C-C2C
6	A	1207	CLR	C13-C17-C20-C21
4	A	1205	Y01	CAJ-CAO-CBB-CBE
6	A	1220	CLR	C17-C20-C22-C23
4	A	1205	Y01	CAJ-CAO-CBB-CAC
6	A	1206	CLR	C13-C17-C20-C22
12	A	1224	EUJ	C2B-C1B-O3C-C3C
5	A	1204	LMT	C4'-C5'-C6'-O6'
6	A	1220	CLR	C21-C20-C22-C23
12	A	1224	EUJ	O1B-C1B-O3C-C3C

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Mol	Chain	Res	Type	Atoms
6	A	1207	CLR	C16-C17-C20-C22
4	A	1203	Y01	CAX-CAL-CAM-CAY
6	A	1220	CLR	C22-C23-C24-C25
6	A	1206	CLR	C13-C17-C20-C21
12	A	1224	EUJ	C3A-C4A-C5A-C6A
4	A	1205	Y01	CAJ-CAN-CBA-CAB
7	A	1219	D10	C5-C6-C7-C8
8	A	1215	C14	C05-C06-C07-C08
4	A	1208	Y01	CAJ-CAN-CBA-CAB
4	A	1203	Y01	OAG-CAY-OAW-CBC
7	A	1218	D10	C3-C4-C5-C6
4	A	1203	Y01	CAM-CAY-OAW-CBC
6	A	1221	CLR	C20-C22-C23-C24
10	A	1222	NAG	O5-C5-C6-O6
7	A	1212	D10	C5-C6-C7-C8
12	A	1224	EUJ	C4A-C5A-C6A-C7A
12	A	1224	EUJ	C1A-C2A-C3A-C4A
7	A	1217	D10	C5-C6-C7-C8
6	A	1206	CLR	C16-C17-C20-C21
6	A	1207	CLR	C16-C17-C20-C21
6	A	1206	CLR	C16-C17-C20-C22
6	A	1206	CLR	C22-C23-C24-C25
5	A	1204	LMT	C2-C1-O1'-C1'
6	A	1206	CLR	C20-C22-C23-C24
7	A	1209	D10	C7-C8-C9-C10
12	A	1224	EUJ	C1-O1-P1-O11
4	A	1208	Y01	CAJ-CAN-CBA-CAA
4	A	1205	Y01	CAJ-CAN-CBA-CAA
12	A	1224	EUJ	O13-C1C-C2C-C3C
9	A	1216	D12	C11-C10-C9-C8
11	A	1223	SPK	N1-C2-C3-C4
9	A	1216	D12	C9-C10-C11-C12
7	A	1219	D10	C7-C8-C9-C10
6	A	1207	CLR	C13-C17-C20-C22
7	A	1210	D10	C4-C5-C6-C7
12	A	1224	EUJ	O13-C1C-C2C-O2C
4	A	1205	Y01	CAR-CBC-OAW-CAY
7	A	1209	D10	C5-C6-C7-C8
12	A	1224	EUJ	C2B-C3B-C4B-C5B
12	A	1224	EUJ	C2C-C1C-O13-P1
8	A	1215	C14	C01-C02-C03-C04
12	A	1224	EUJ	C1C-O13-P1-O1

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Mol	Chain	Res	Type	Atoms
12	A	1224	EUJ	C4-C5-O5-P5
5	A	1204	LMT	C5-C6-C7-C8
7	A	1214	D10	C4-C5-C6-C7
4	A	1203	Y01	CAM-CAL-CAX-OAF
7	A	1217	D10	C4-C5-C6-C7
7	A	1212	D10	C4-C5-C6-C7
5	A	1204	LMT	C11-C10-C9-C8
5	A	1204	LMT	C3-C4-C5-C6
4	A	1205	Y01	CAV-CBC-OAW-CAY
4	A	1203	Y01	CAM-CAL-CAX-OAH
7	A	1210	D10	C1-C2-C3-C4
9	A	1216	D12	C4-C5-C6-C7
12	A	1224	EUJ	C2-C3-O3-P3
4	A	1208	Y01	CAJ-CAO-CBB-CBE
5	A	1204	LMT	C1-C2-C3-C4
4	A	1208	Y01	CAJ-CAO-CBB-CAC
7	A	1210	D10	C3-C4-C5-C6
7	A	1212	D10	C1-C2-C3-C4
9	A	1216	D12	C6-C7-C8-C9
7	A	1214	D10	C5-C6-C7-C8
4	A	1203	Y01	CAJ-CAO-CBB-CBE
12	A	1224	EUJ	O2C-C1A-C2A-C3A
8	A	1215	C14	C04-C05-C06-C07
7	A	1210	D10	C5-C6-C7-C8
7	A	1213	D10	C1-C2-C3-C4

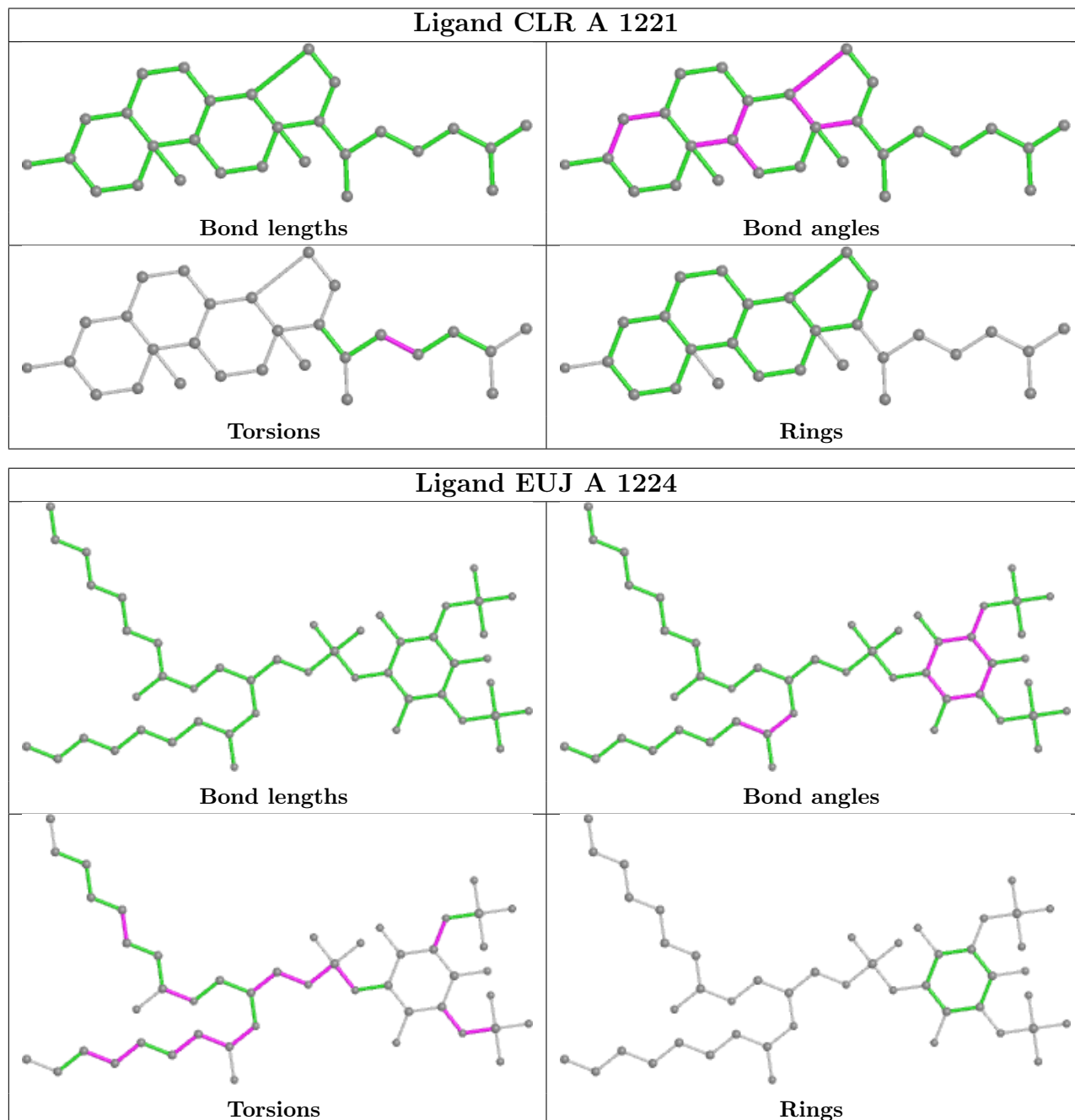
There are no ring outliers.

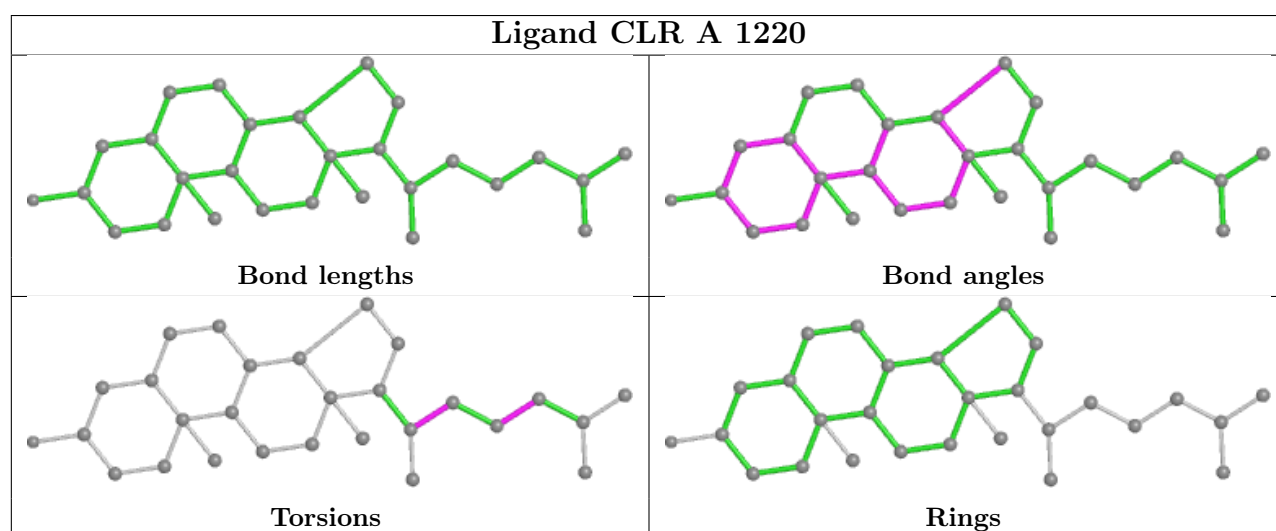
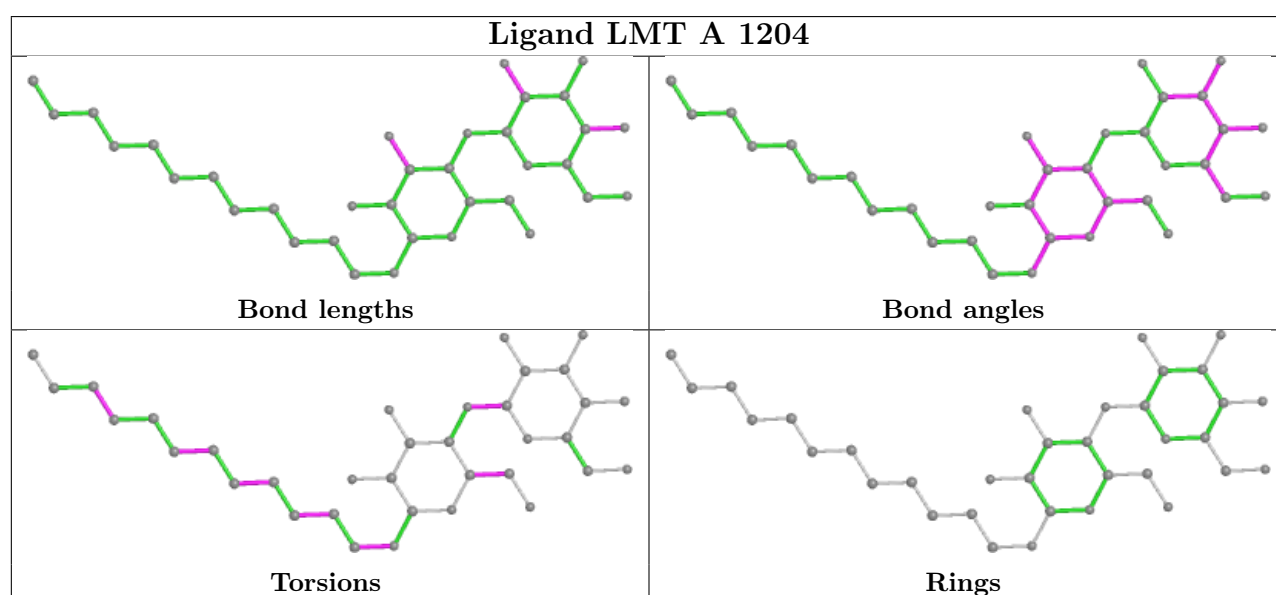
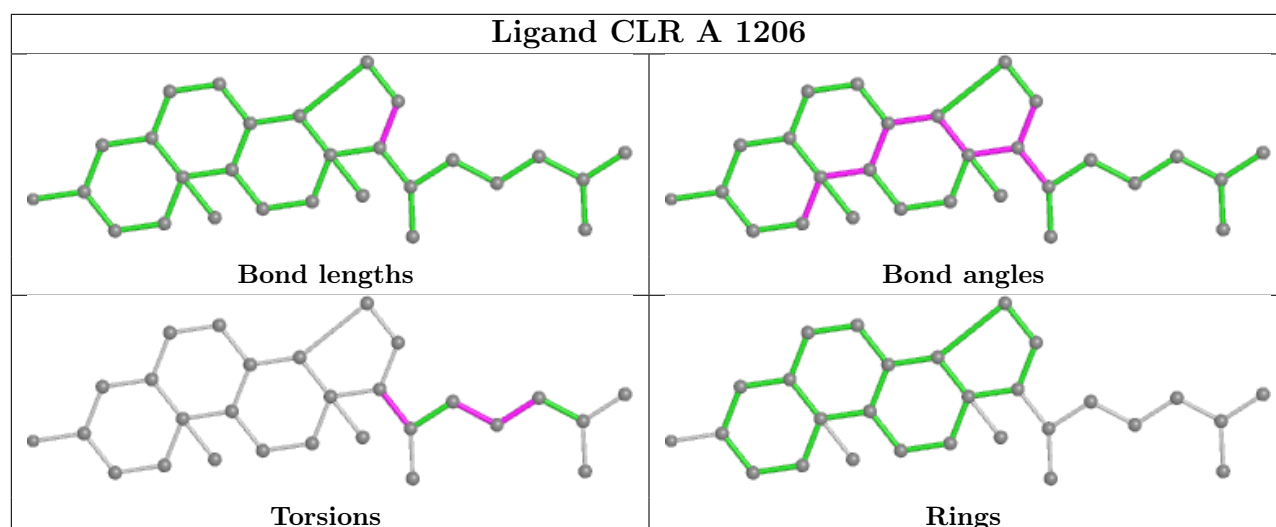
5 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	1204	LMT	1	0
6	A	1220	CLR	1	0
11	A	1223	SPK	1	0
6	A	1207	CLR	1	0
4	A	1205	Y01	2	0

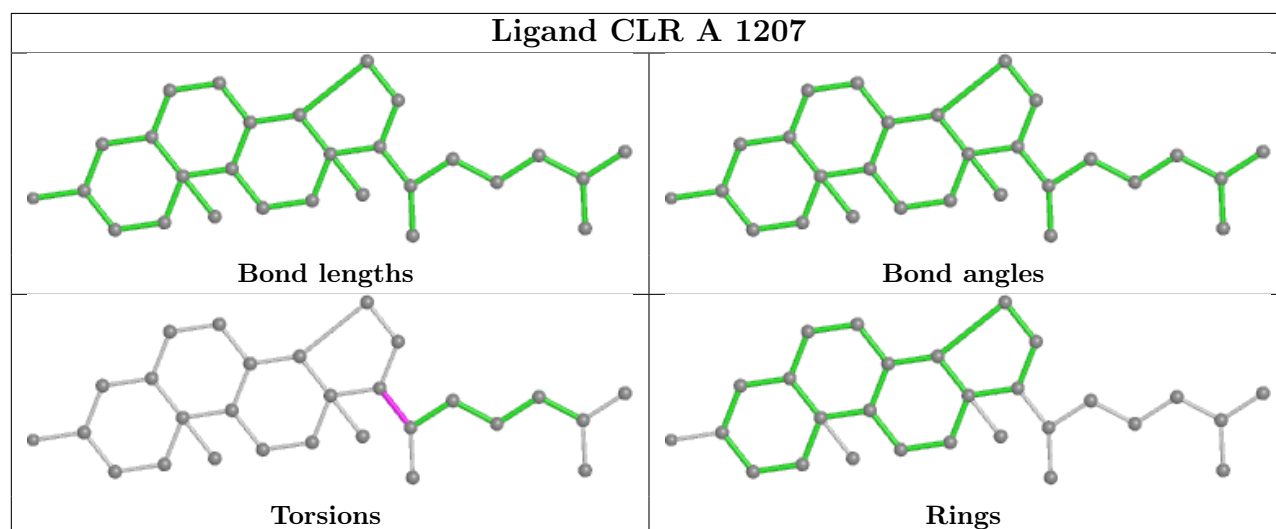
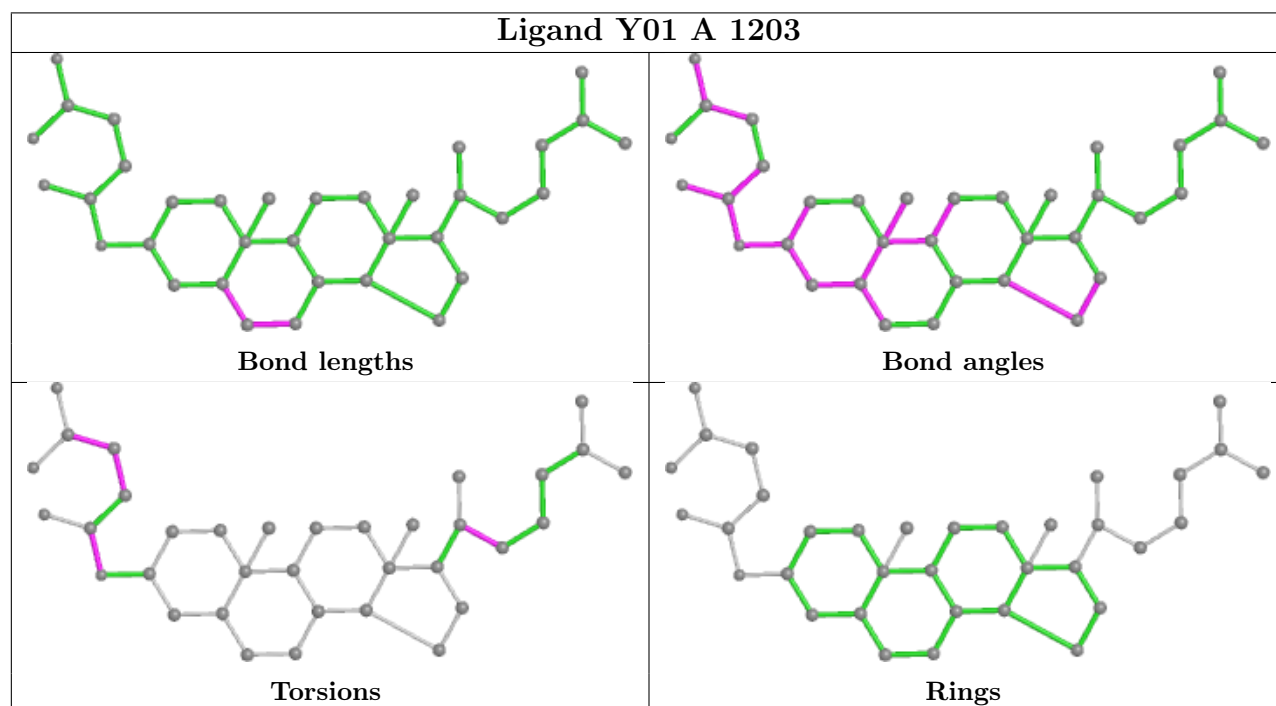
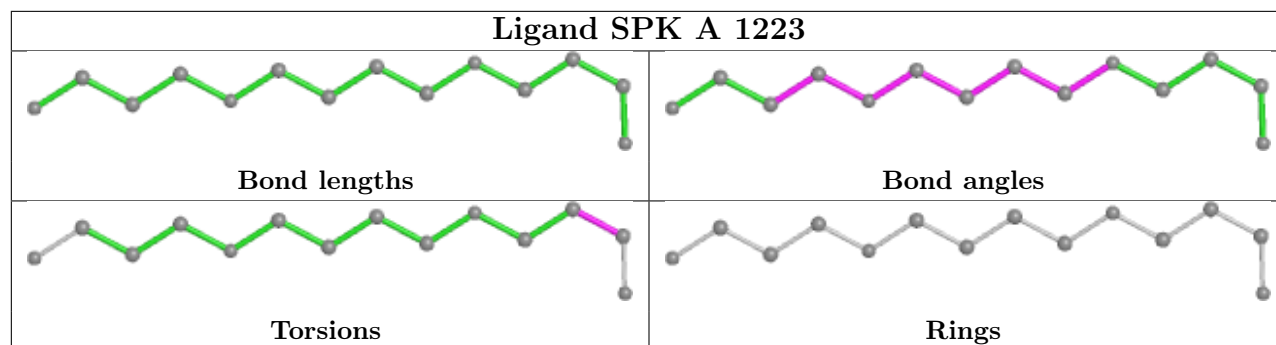
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

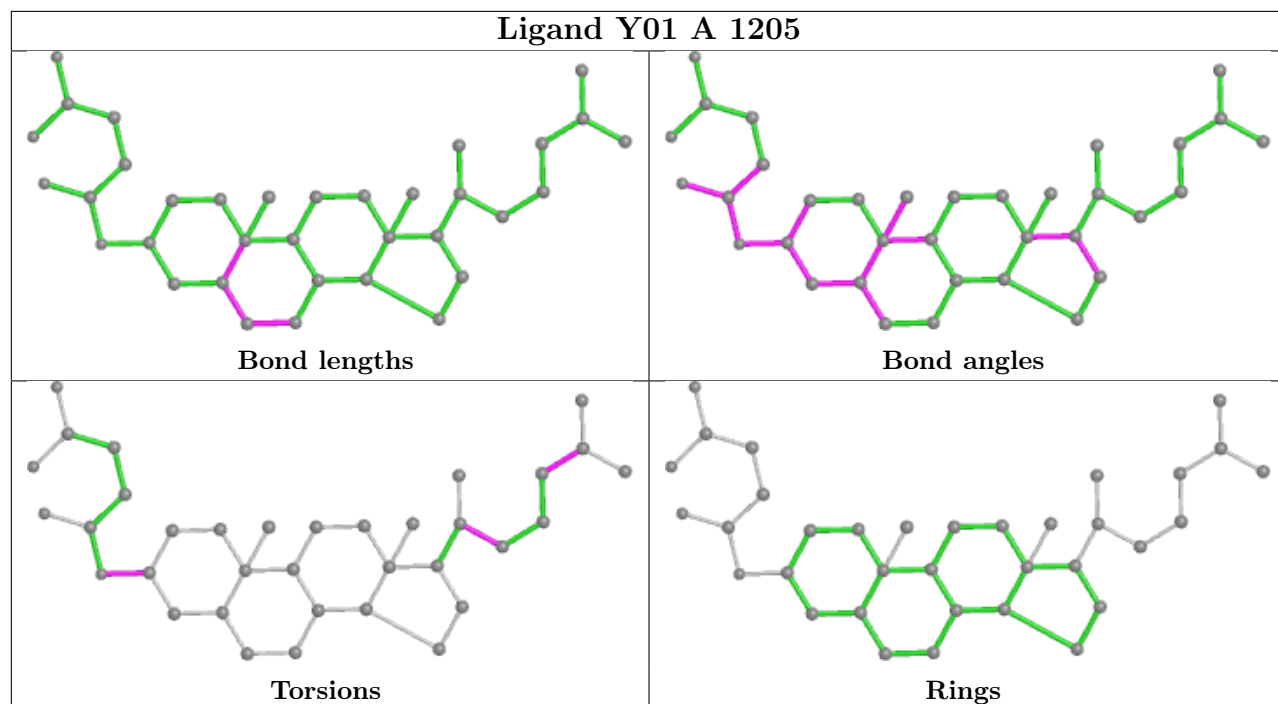
highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified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

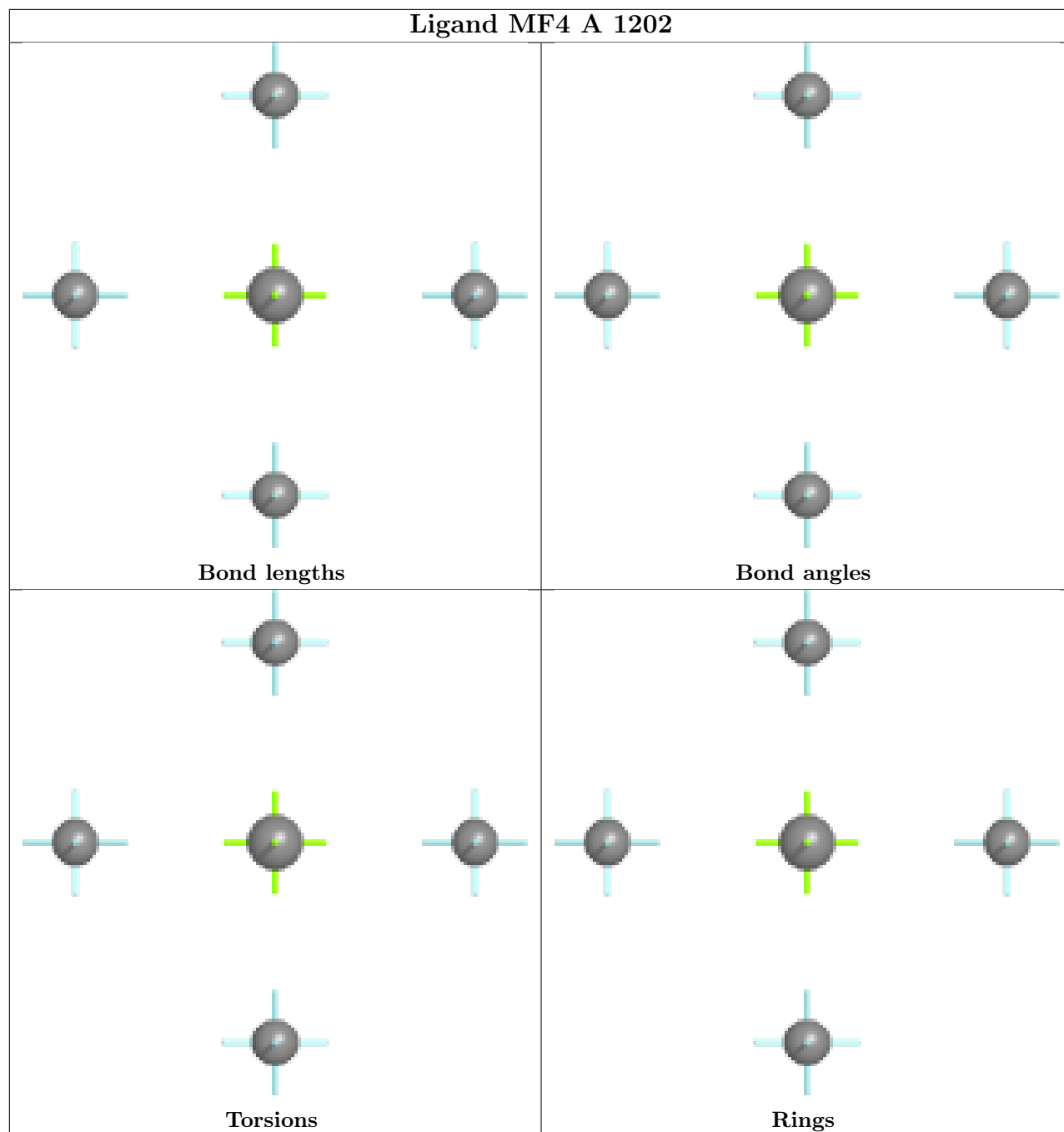


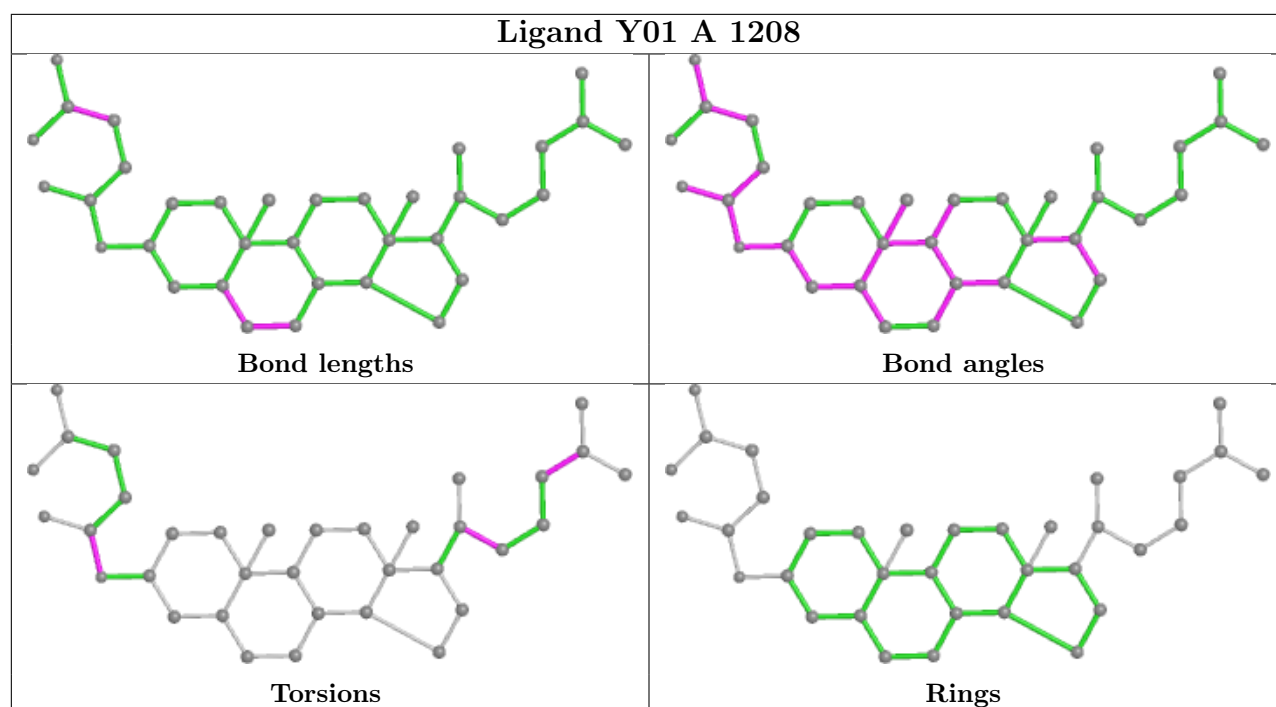












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

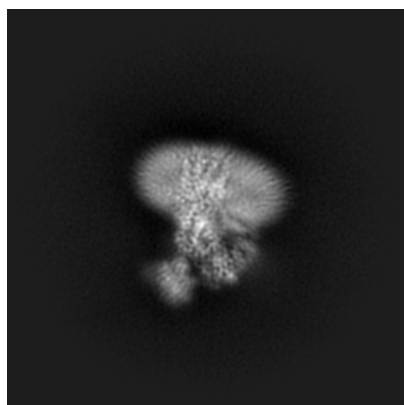
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-23685. These allow visual inspection of the internal detail of the map and identification of artifacts.

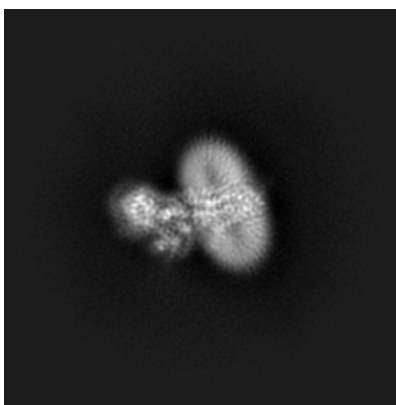
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

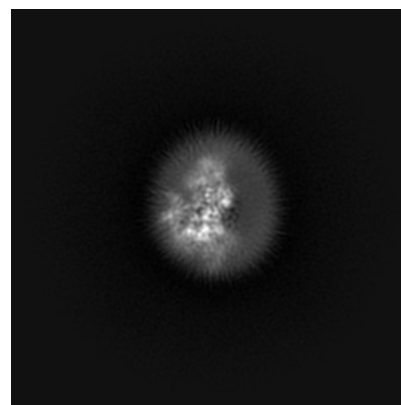
#### 6.1.1 Primary map



X



Y

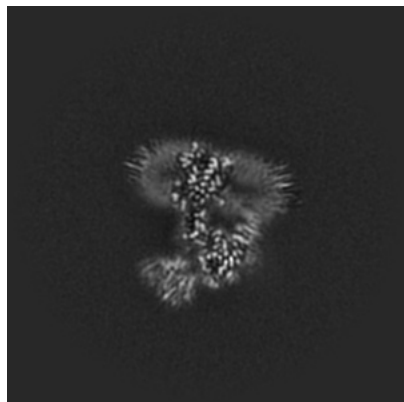


Z

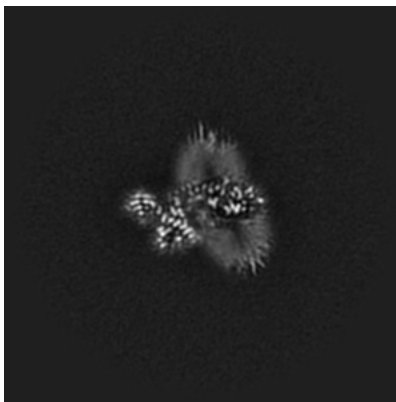
The images above show the map projected in three orthogonal directions.

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

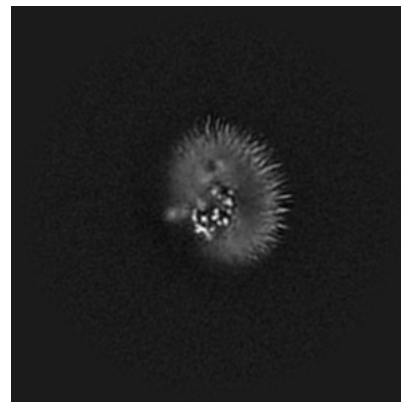
#### 6.2.1 Primary map



X Index: 192



Y Index: 192

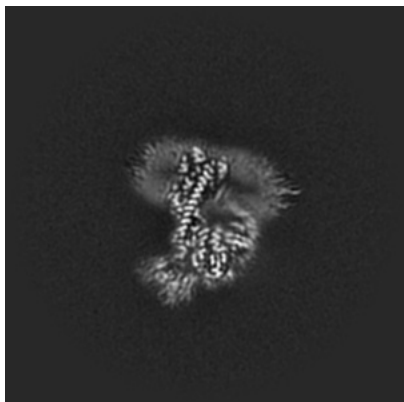


Z Index: 192

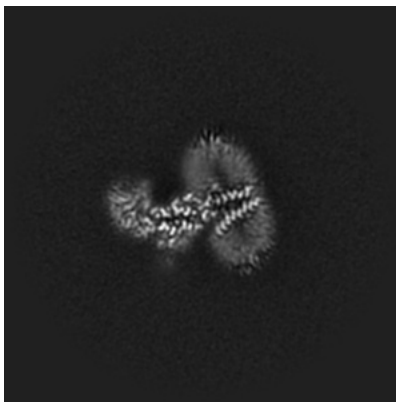
The images above show central slices of the map in three orthogonal directions.

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

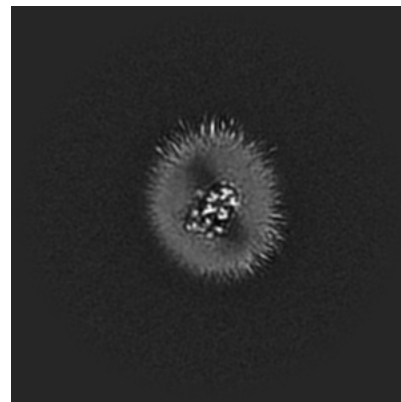
### 6.3.1 Primary map



X Index: 188



Y Index: 170

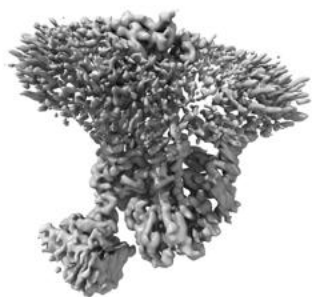


Z Index: 212

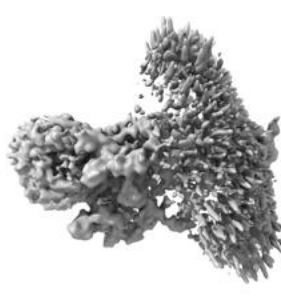
The images above show the largest variance slices of the map in three orthogonal directions.

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

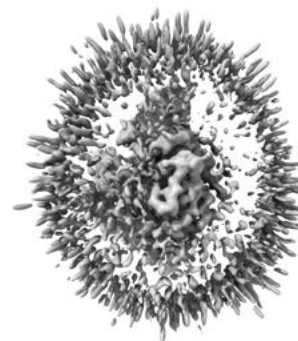
### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.2. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

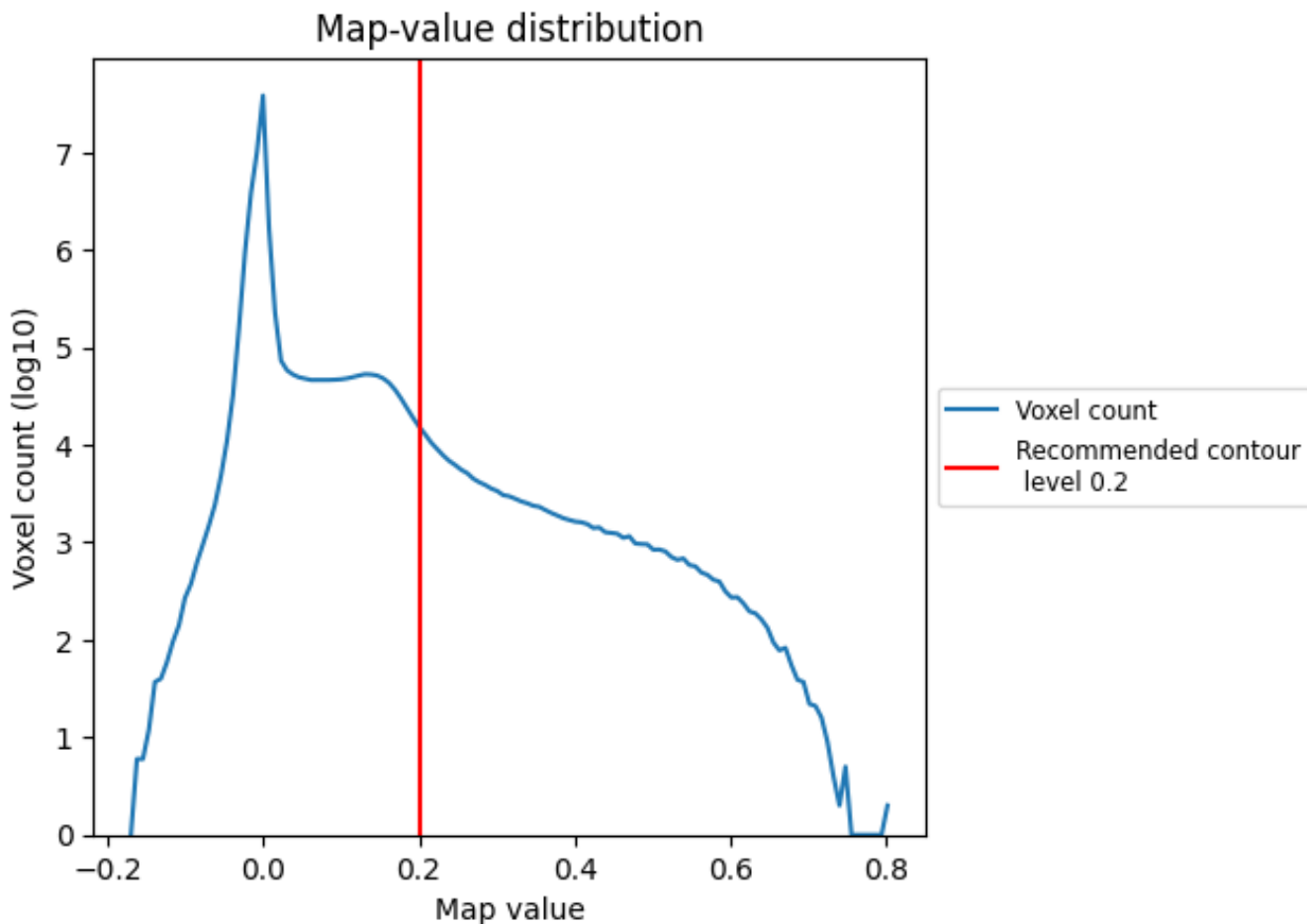
## 6.5 Mask visualisation

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.

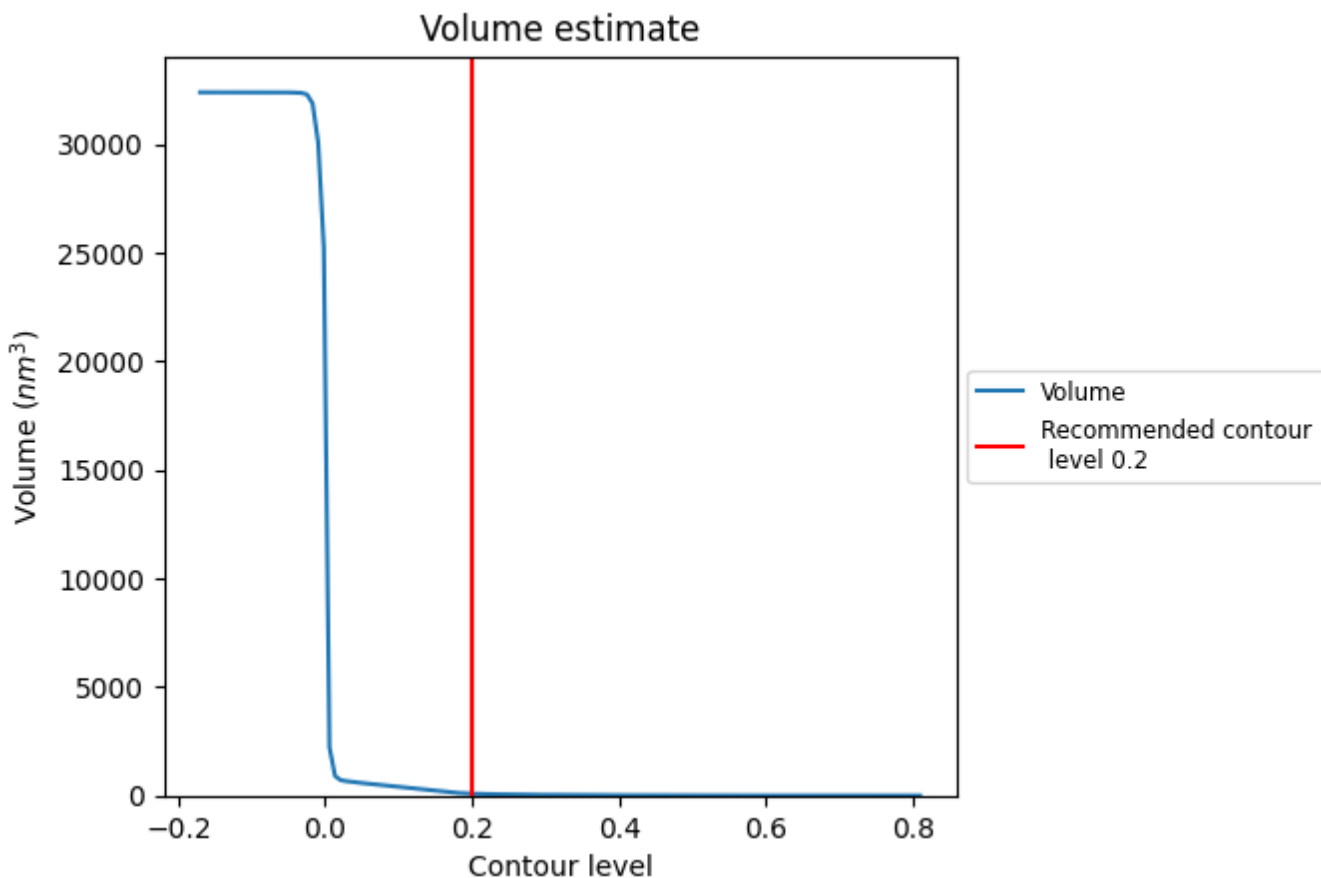
### 7.1 Map-value distribution [i](#)



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.



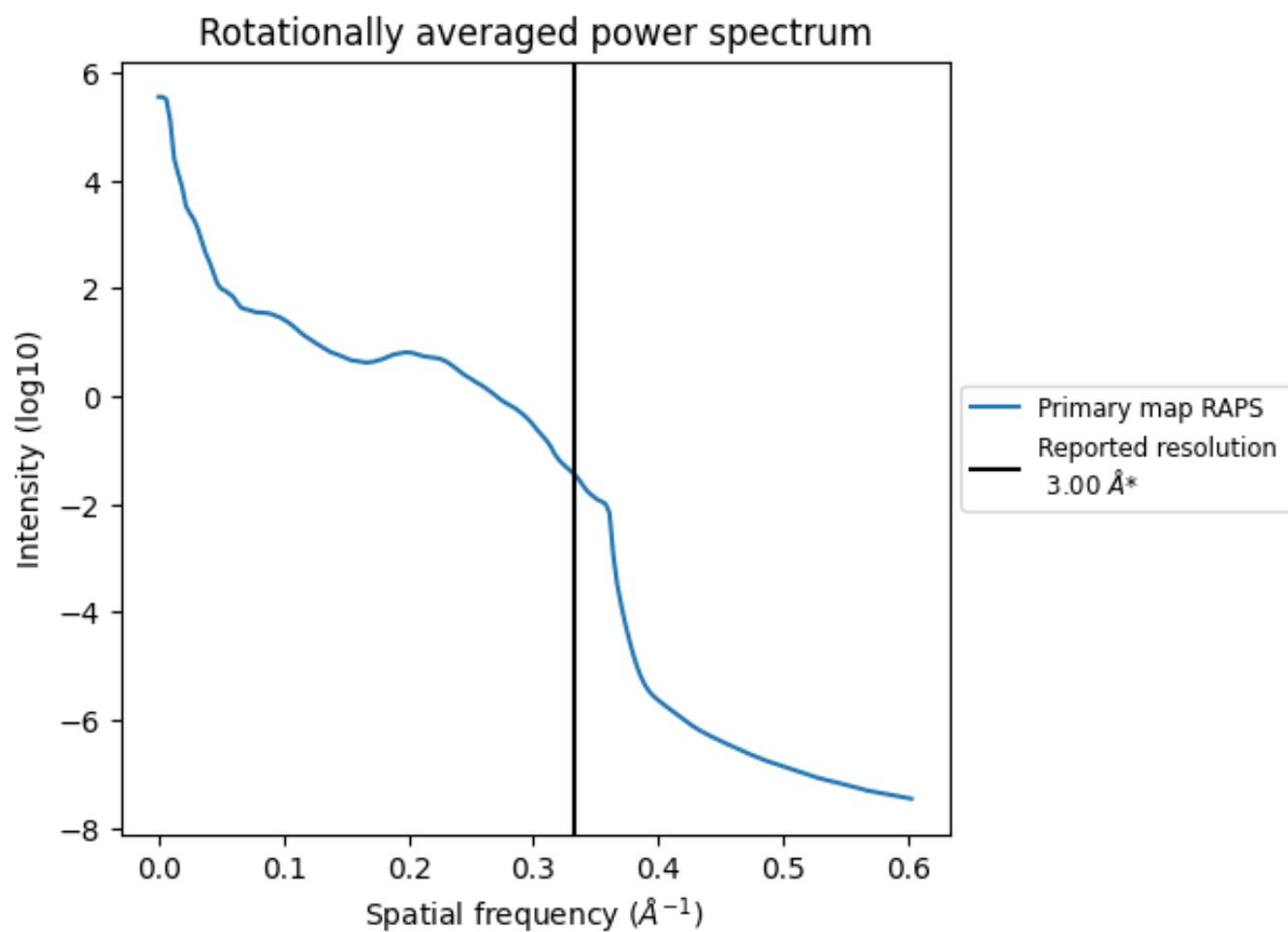
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 88  $\text{nm}^3$ ; this corresponds to an approximate mass of 80 kDa.

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

### 7.3 Rotationally averaged power spectrum [i](#)



\*Reported resolution corresponds to spatial frequency of  $0.333 \text{\AA}^{-1}$

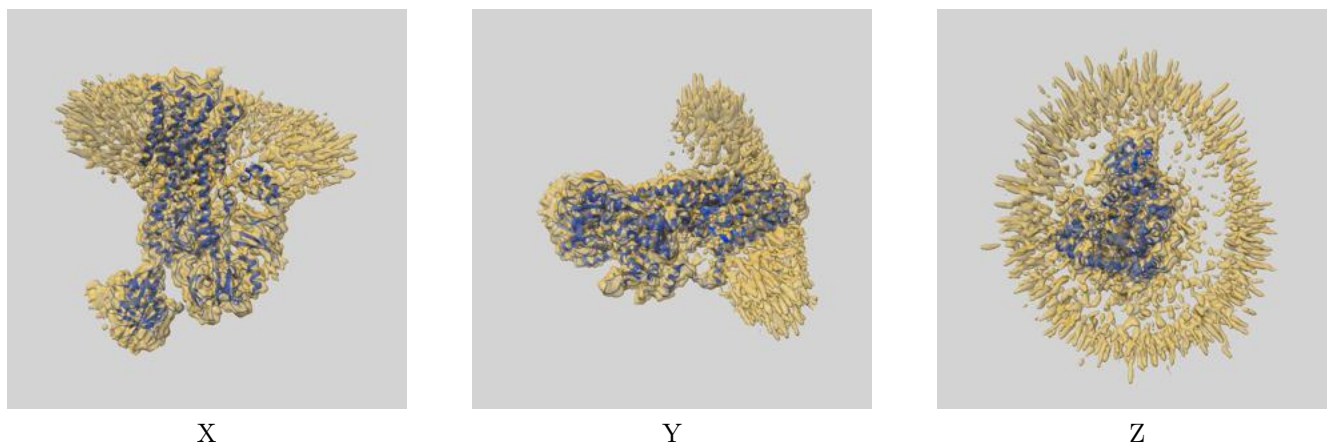
## 8 Fourier-Shell correlation

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

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

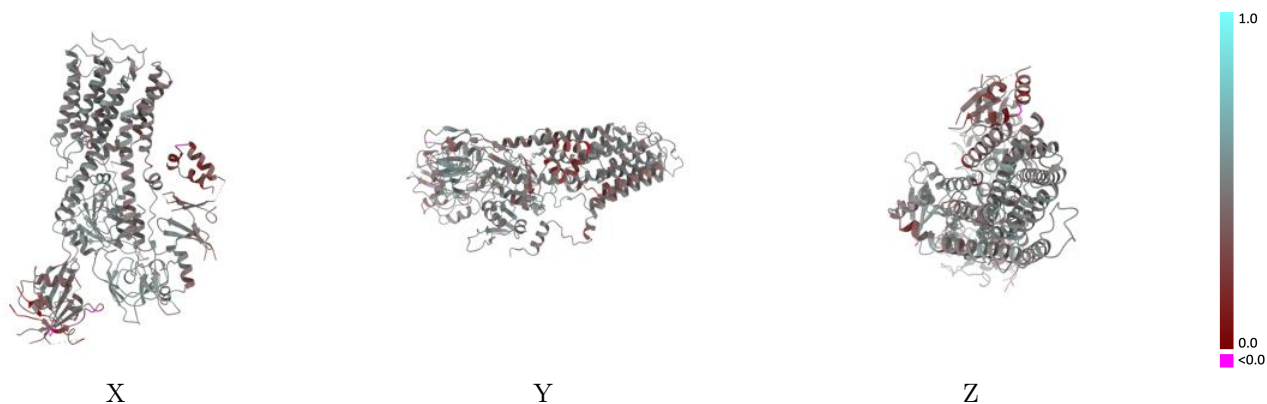
This section contains information regarding the fit between EMDB map EMD-23685 and PDB model 7M5Y. Per-residue inclusion information can be found in section 3 on page 10.

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



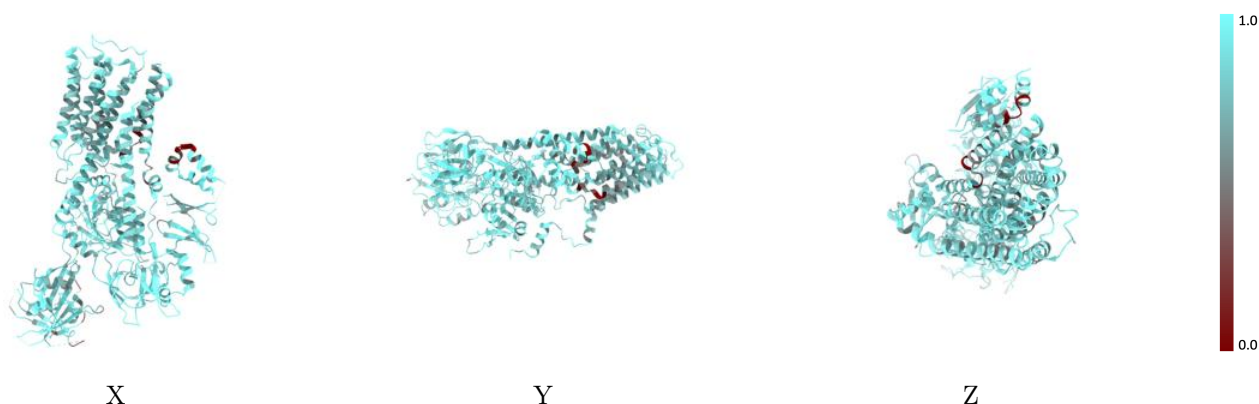
The images above show the 3D surface view of the map at the recommended contour level 0.2 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



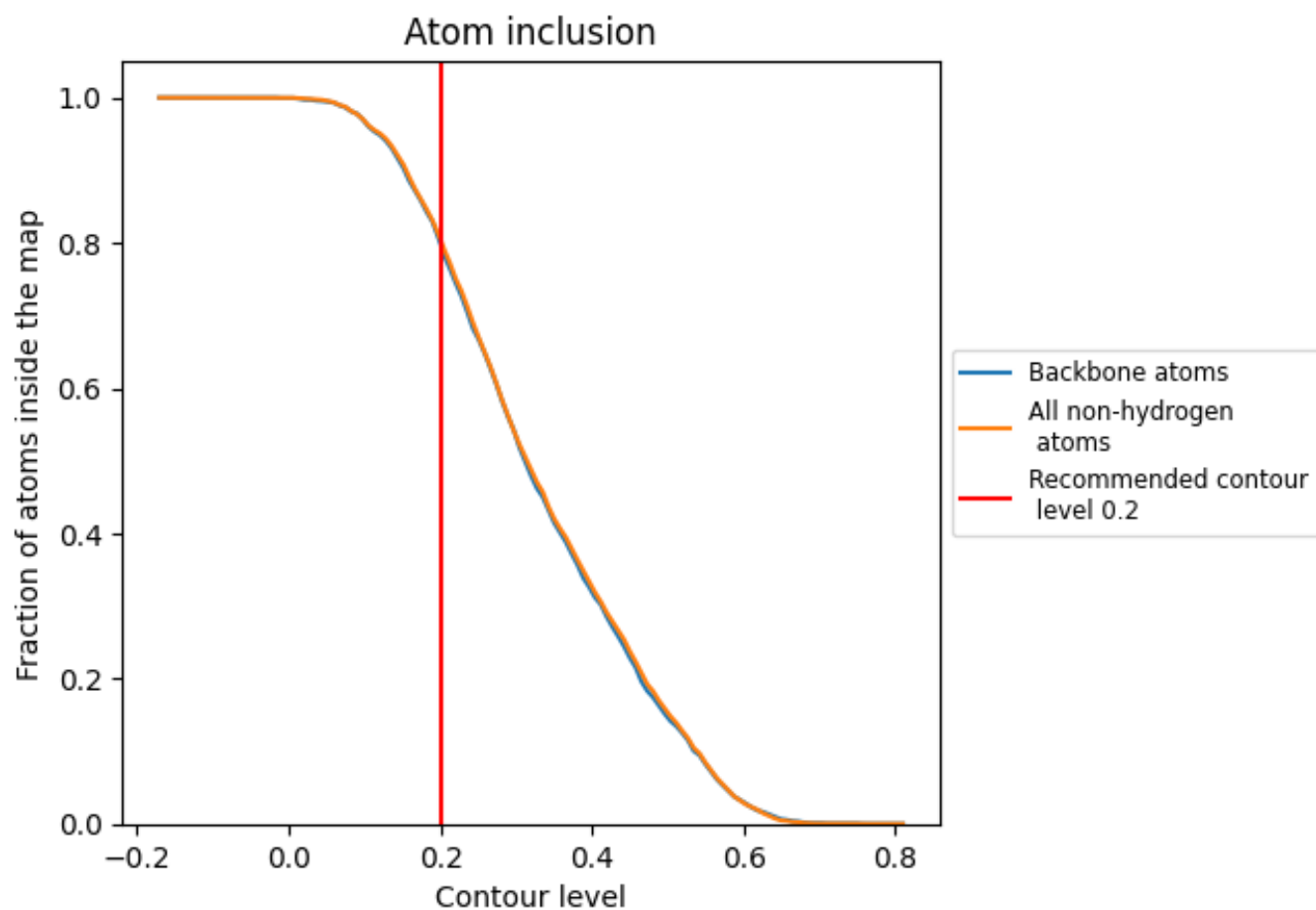
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.2).





## 9.4 Atom inclusion [i](#)



At the recommended contour level, 80% of all backbone atoms, 81% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary [i](#)

The table lists the average atom inclusion at the recommended contour level (0.2) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8058	 0.4520
A	 0.8126	 0.4520

