



## wwPDB EM Validation Summary Report ⓘ

Jan 18, 2025 – 12:24 PM EST

PDB ID : 9B28  
EMDB ID : EMD-44100  
Title : Cryo-EM structure of the mouse TRPM3 alpha 2 channel in complex with primidone  
Authors : Yin, Y.; Park, C.G.; Feng, S.; Zhang, F.; Guan, Z.; Sharma, K.; Borgnia, M.J.; Im, W.; Lee, S.-Y.  
Deposited on : 2024-03-14  
Resolution : 3.24 Å (reported)  
Based on initial model : 6BPQ

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.dev113  
Mogul : 2022.3.0, CSD as543be (2022)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.40

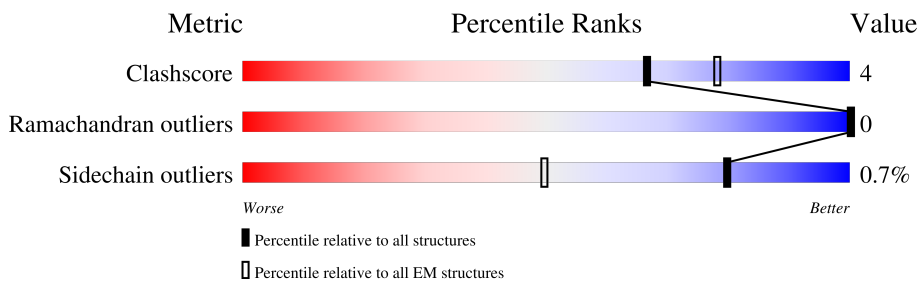
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.24 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	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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	1739	
1	B	1739	
1	C	1739	
1	D	1739	

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 50704 atoms, of which 23832 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 Transient receptor potential cation channel, subfamily M, member 3.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
1	A	925	12392	4264	5797	1127	1163	41	0	0
1	C	925	12392	4264	5797	1127	1163	41	0	0
1	B	925	12392	4264	5797	1127	1163	41	0	0
1	D	925	12392	4264	5797	1127	1163	41	0	0

There are 120 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1710	SER	-	expression tag	UNP Q5F4S7
A	1711	ASN	-	expression tag	UNP Q5F4S7
A	1712	SER	-	expression tag	UNP Q5F4S7
A	1713	LEU	-	expression tag	UNP Q5F4S7
A	1714	GLU	-	expression tag	UNP Q5F4S7
A	1715	VAL	-	expression tag	UNP Q5F4S7
A	1716	LEU	-	expression tag	UNP Q5F4S7
A	1717	PHE	-	expression tag	UNP Q5F4S7
A	1718	GLN	-	expression tag	UNP Q5F4S7
A	1719	GLY	-	expression tag	UNP Q5F4S7
A	1720	PRO	-	expression tag	UNP Q5F4S7
A	1721	ASP	-	expression tag	UNP Q5F4S7
A	1722	TYR	-	expression tag	UNP Q5F4S7
A	1723	LYS	-	expression tag	UNP Q5F4S7
A	1724	ASP	-	expression tag	UNP Q5F4S7
A	1725	ASP	-	expression tag	UNP Q5F4S7
A	1726	ASP	-	expression tag	UNP Q5F4S7
A	1727	ASP	-	expression tag	UNP Q5F4S7
A	1728	LYS	-	expression tag	UNP Q5F4S7
A	1729	ALA	-	expression tag	UNP Q5F4S7
A	1730	HIS	-	expression tag	UNP Q5F4S7

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Chain	Residue	Modelled	Actual	Comment	Reference
A	1731	HIS	-	expression tag	UNP Q5F4S7
A	1732	HIS	-	expression tag	UNP Q5F4S7
A	1733	HIS	-	expression tag	UNP Q5F4S7
A	1734	HIS	-	expression tag	UNP Q5F4S7
A	1735	HIS	-	expression tag	UNP Q5F4S7
A	1736	HIS	-	expression tag	UNP Q5F4S7
A	1737	HIS	-	expression tag	UNP Q5F4S7
A	1738	HIS	-	expression tag	UNP Q5F4S7
A	1739	HIS	-	expression tag	UNP Q5F4S7
C	1710	SER	-	expression tag	UNP Q5F4S7
C	1711	ASN	-	expression tag	UNP Q5F4S7
C	1712	SER	-	expression tag	UNP Q5F4S7
C	1713	LEU	-	expression tag	UNP Q5F4S7
C	1714	GLU	-	expression tag	UNP Q5F4S7
C	1715	VAL	-	expression tag	UNP Q5F4S7
C	1716	LEU	-	expression tag	UNP Q5F4S7
C	1717	PHE	-	expression tag	UNP Q5F4S7
C	1718	GLN	-	expression tag	UNP Q5F4S7
C	1719	GLY	-	expression tag	UNP Q5F4S7
C	1720	PRO	-	expression tag	UNP Q5F4S7
C	1721	ASP	-	expression tag	UNP Q5F4S7
C	1722	TYR	-	expression tag	UNP Q5F4S7
C	1723	LYS	-	expression tag	UNP Q5F4S7
C	1724	ASP	-	expression tag	UNP Q5F4S7
C	1725	ASP	-	expression tag	UNP Q5F4S7
C	1726	ASP	-	expression tag	UNP Q5F4S7
C	1727	ASP	-	expression tag	UNP Q5F4S7
C	1728	LYS	-	expression tag	UNP Q5F4S7
C	1729	ALA	-	expression tag	UNP Q5F4S7
C	1730	HIS	-	expression tag	UNP Q5F4S7
C	1731	HIS	-	expression tag	UNP Q5F4S7
C	1732	HIS	-	expression tag	UNP Q5F4S7
C	1733	HIS	-	expression tag	UNP Q5F4S7
C	1734	HIS	-	expression tag	UNP Q5F4S7
C	1735	HIS	-	expression tag	UNP Q5F4S7
C	1736	HIS	-	expression tag	UNP Q5F4S7
C	1737	HIS	-	expression tag	UNP Q5F4S7
C	1738	HIS	-	expression tag	UNP Q5F4S7
C	1739	HIS	-	expression tag	UNP Q5F4S7
B	1710	SER	-	expression tag	UNP Q5F4S7
B	1711	ASN	-	expression tag	UNP Q5F4S7
B	1712	SER	-	expression tag	UNP Q5F4S7

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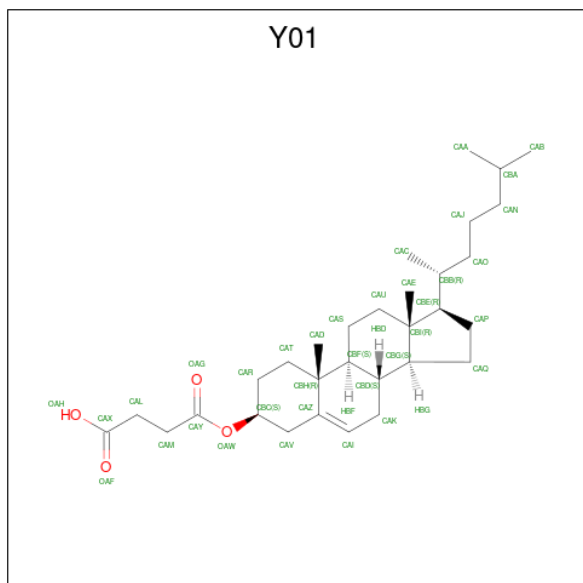
Chain	Residue	Modelled	Actual	Comment	Reference
B	1713	LEU	-	expression tag	UNP Q5F4S7
B	1714	GLU	-	expression tag	UNP Q5F4S7
B	1715	VAL	-	expression tag	UNP Q5F4S7
B	1716	LEU	-	expression tag	UNP Q5F4S7
B	1717	PHE	-	expression tag	UNP Q5F4S7
B	1718	GLN	-	expression tag	UNP Q5F4S7
B	1719	GLY	-	expression tag	UNP Q5F4S7
B	1720	PRO	-	expression tag	UNP Q5F4S7
B	1721	ASP	-	expression tag	UNP Q5F4S7
B	1722	TYR	-	expression tag	UNP Q5F4S7
B	1723	LYS	-	expression tag	UNP Q5F4S7
B	1724	ASP	-	expression tag	UNP Q5F4S7
B	1725	ASP	-	expression tag	UNP Q5F4S7
B	1726	ASP	-	expression tag	UNP Q5F4S7
B	1727	ASP	-	expression tag	UNP Q5F4S7
B	1728	LYS	-	expression tag	UNP Q5F4S7
B	1729	ALA	-	expression tag	UNP Q5F4S7
B	1730	HIS	-	expression tag	UNP Q5F4S7
B	1731	HIS	-	expression tag	UNP Q5F4S7
B	1732	HIS	-	expression tag	UNP Q5F4S7
B	1733	HIS	-	expression tag	UNP Q5F4S7
B	1734	HIS	-	expression tag	UNP Q5F4S7
B	1735	HIS	-	expression tag	UNP Q5F4S7
B	1736	HIS	-	expression tag	UNP Q5F4S7
B	1737	HIS	-	expression tag	UNP Q5F4S7
B	1738	HIS	-	expression tag	UNP Q5F4S7
B	1739	HIS	-	expression tag	UNP Q5F4S7
D	1710	SER	-	expression tag	UNP Q5F4S7
D	1711	ASN	-	expression tag	UNP Q5F4S7
D	1712	SER	-	expression tag	UNP Q5F4S7
D	1713	LEU	-	expression tag	UNP Q5F4S7
D	1714	GLU	-	expression tag	UNP Q5F4S7
D	1715	VAL	-	expression tag	UNP Q5F4S7
D	1716	LEU	-	expression tag	UNP Q5F4S7
D	1717	PHE	-	expression tag	UNP Q5F4S7
D	1718	GLN	-	expression tag	UNP Q5F4S7
D	1719	GLY	-	expression tag	UNP Q5F4S7
D	1720	PRO	-	expression tag	UNP Q5F4S7
D	1721	ASP	-	expression tag	UNP Q5F4S7
D	1722	TYR	-	expression tag	UNP Q5F4S7
D	1723	LYS	-	expression tag	UNP Q5F4S7
D	1724	ASP	-	expression tag	UNP Q5F4S7

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Chain	Residue	Modelled	Actual	Comment	Reference
D	1725	ASP	-	expression tag	UNP Q5F4S7
D	1726	ASP	-	expression tag	UNP Q5F4S7
D	1727	ASP	-	expression tag	UNP Q5F4S7
D	1728	LYS	-	expression tag	UNP Q5F4S7
D	1729	ALA	-	expression tag	UNP Q5F4S7
D	1730	HIS	-	expression tag	UNP Q5F4S7
D	1731	HIS	-	expression tag	UNP Q5F4S7
D	1732	HIS	-	expression tag	UNP Q5F4S7
D	1733	HIS	-	expression tag	UNP Q5F4S7
D	1734	HIS	-	expression tag	UNP Q5F4S7
D	1735	HIS	-	expression tag	UNP Q5F4S7
D	1736	HIS	-	expression tag	UNP Q5F4S7
D	1737	HIS	-	expression tag	UNP Q5F4S7
D	1738	HIS	-	expression tag	UNP Q5F4S7
D	1739	HIS	-	expression tag	UNP Q5F4S7

- Molecule 2 is CHOLESTEROL HEMISUCCINATE (three-letter code: Y01) (formula: C<sub>31</sub>H<sub>50</sub>O<sub>4</sub>).



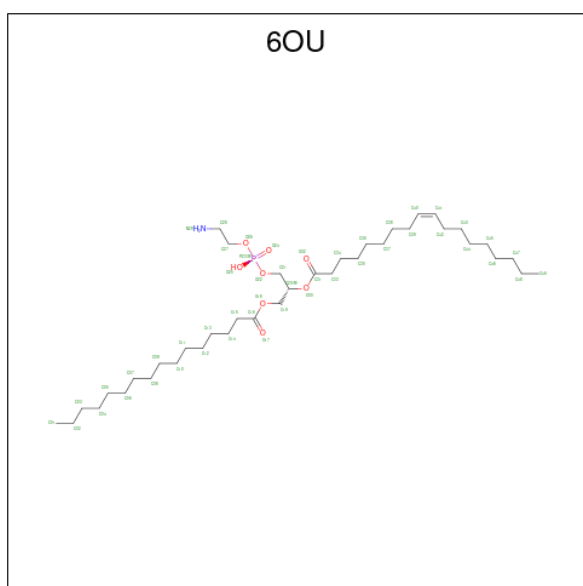
Mol	Chain	Residues	Atoms				AltConf
2	A	1	Total	C	H	O	0
			84	31	49	4	
2	A	1	Total	C	H	O	0
			84	31	49	4	
2	C	1	Total	C	H	O	0
			84	31	49	4	
2	C	1	Total	C	H	O	0
			84	31	49	4	

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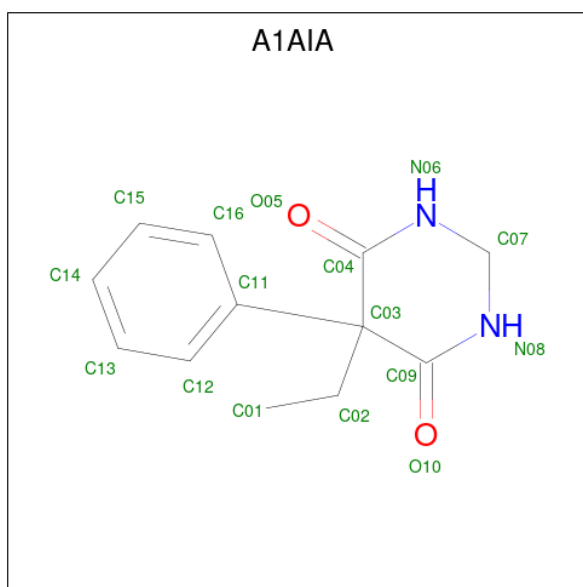
Mol	Chain	Residues	Atoms				AltConf
			Total	C	H	O	
2	B	1	Total 84	C 31	H 49	O 4	0
2	B	1	Total 84	C 31	H 49	O 4	0
2	D	1	Total 84	C 31	H 49	O 4	0
2	D	1	Total 84	C 31	H 49	O 4	0

- Molecule 3 is [(2 {R})-1-[2-azanylethoxy(oxidanyl)phosphoryl]oxy-3-hexadecanoyloxy-prop an-2-yl] ( {Z})-octadec-9-enoate (three-letter code: 6OU) (formula: C<sub>39</sub>H<sub>76</sub>NO<sub>8</sub>P).



Mol	Chain	Residues	Atoms					AltConf	
			Total	C	H	N	O		P
3	A	1	Total 86	C 27	H 49	N 1	O 8	P 1	0
3	C	1	Total 86	C 27	H 49	N 1	O 8	P 1	0
3	B	1	Total 86	C 27	H 49	N 1	O 8	P 1	0
3	D	1	Total 86	C 27	H 49	N 1	O 8	P 1	0

- Molecule 4 is primidone (three-letter code: A1AIA) (formula: C<sub>12</sub>H<sub>14</sub>N<sub>2</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	H	N	O	
4	A	1	Total	C	H	N	O	0
			30	12	14	2	2	
4	C	1	Total	C	H	N	O	0
			30	12	14	2	2	
4	B	1	Total	C	H	N	O	0
			30	12	14	2	2	
4	D	1	Total	C	H	N	O	0
			30	12	14	2	2	











ASN	SER	LEU	GLU	VAL	LEU	PHE	GLN	TYR	ASP	LYS	ASP	ASP	ASP	LYS	ALA	ALA	HIS	HIS	HIS	HIS	HIS	HIS	HIS	HIS
HIS	THR	THR	THR	ARG	ARG	VAL	GLY	ASP	PHE	ASP	SER	SER	LEU	GLY	ASP	ASP	THR	GLY	LEU	LEU	LEU	LEU	LEU	SER
GLU	SER	SER	LEU	TYR	GLY	VAL	GLY	ASP	THR	THR	ASP	THR	THR	THR	ALA	ALA	THR	THR	THR	THR	THR	THR	THR	THR
GLU	SER	PRO	ASP	ALA	ASP	VAL	ASP	GLY	GLY	THR	THR	THR	THR	THR	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA
ARG	SER	TYR	TYR	ALA	ASP	VAL	GLY	ASP	THR	THR	THR	THR	THR	THR	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA
THR	ARG	SER	THR	SER	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR
GLU	LEU	HIS	LEU	ASP	LEU	GLY	ASP	GLY	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR
GLY	ILE	LEU	LEU	ILE	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO
CYS	THR	ASP	ALA	TYR	VAL	PHE	ARG	ASN	THR	ASN	THR	THR	THR	THR	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA
ASP	GLU	THR	ARG	ASP	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR
ASP	GLU	THR	VAL	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR
ASP	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR
ASP	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR
ASP	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR
ASP	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR
ASP	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR
ASP	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR
ASP	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR
ASP	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR
ASP	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR
ASP	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR
ASP	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR
ASP	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C4	Depositor
Number of particles used	104425	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 ( $e^-/\text{\AA}^2$ )	50	Depositor
Minimum defocus (nm)	1250	Depositor
Maximum defocus (nm)	2750	Depositor
Magnification	81000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	1.724	Depositor
Minimum map value	-0.892	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.042	Depositor
Recommended contour level	0.1	Depositor
Map size (Å)	358.4, 358.4, 358.4	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.12, 1.12, 1.12	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: 6OU, Y01, A1AIA

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	0.27	0/6731	0.43	0/9178
1	B	0.27	0/6731	0.43	0/9178
1	C	0.27	0/6731	0.43	0/9178
1	D	0.27	0/6731	0.43	0/9178
All	All	0.27	0/26924	0.43	0/36712

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	6595	5797	5852	48	0
1	B	6595	5797	5852	47	0
1	C	6595	5797	5852	50	0
1	D	6595	5797	5852	47	0
2	A	70	98	98	2	0
2	B	70	98	98	2	0
2	C	70	98	98	2	0
2	D	70	98	98	3	0
3	A	37	49	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	37	49	0	0	0
3	C	37	49	0	0	0
3	D	37	49	0	0	0
4	A	16	14	0	0	0
4	B	16	14	0	0	0
4	C	16	14	0	0	0
4	D	16	14	0	0	0
All	All	26872	23832	23800	187	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.

The worst 5 of 187 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:867:PHE:O	1:D:873:VAL:HG21	1.91	0.71
1:A:867:PHE:O	1:A:873:VAL:HG21	1.91	0.71
1:C:867:PHE:O	1:C:873:VAL:HG21	1.91	0.71
1:B:867:PHE:O	1:B:873:VAL:HG21	1.91	0.69
1:A:904:GLN:N	1:A:904:GLN:OE1	2.26	0.69

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	895/1739 (52%)	869 (97%)	26 (3%)	0	100	100
1	B	895/1739 (52%)	869 (97%)	26 (3%)	0	100	100
1	C	895/1739 (52%)	869 (97%)	26 (3%)	0	100	100
1	D	895/1739 (52%)	869 (97%)	26 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
All	All	3580/6956 (52%)	3476 (97%)	104 (3%)	0	100	100

There are no Ramachandran outliers to report.

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

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	563/1545 (36%)	559 (99%)	4 (1%)	81	90
1	B	563/1545 (36%)	559 (99%)	4 (1%)	81	90
1	C	563/1545 (36%)	559 (99%)	4 (1%)	81	90
1	D	563/1545 (36%)	559 (99%)	4 (1%)	81	90
All	All	2252/6180 (36%)	2236 (99%)	16 (1%)	80	90

5 of 16 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	983	TYR
1	D	899	ARG
1	B	885	TYR
1	D	885	TYR
1	C	1240	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 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](#)

16 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	6OU	D	2004	-	36,36,48	1.03	4 (11%)	39,41,53	0.97	2 (5%)
2	Y01	A	2002	-	38,38,38	1.10	3 (7%)	57,57,57	2.31	14 (24%)
3	6OU	A	2004	-	36,36,48	1.03	4 (11%)	39,41,53	0.97	2 (5%)
4	A1AIA	D	2101	-	17,17,17	5.73	9 (52%)	24,24,24	1.00	1 (4%)
2	Y01	B	2002	-	38,38,38	1.10	3 (7%)	57,57,57	2.31	14 (24%)
2	Y01	A	2201	-	38,38,38	1.14	3 (7%)	57,57,57	2.48	17 (29%)
4	A1AIA	B	2101	-	17,17,17	5.73	9 (52%)	24,24,24	1.00	1 (4%)
2	Y01	C	2002	-	38,38,38	1.10	3 (7%)	57,57,57	2.32	13 (22%)
4	A1AIA	A	2101	-	17,17,17	5.73	9 (52%)	24,24,24	0.99	0
2	Y01	D	2002	-	38,38,38	1.10	3 (7%)	57,57,57	2.31	14 (24%)
3	6OU	C	2004	-	36,36,48	1.04	4 (11%)	39,41,53	0.97	2 (5%)
4	A1AIA	C	2101	-	17,17,17	5.73	9 (52%)	24,24,24	1.00	1 (4%)
2	Y01	D	2201	-	38,38,38	1.13	3 (7%)	57,57,57	2.48	18 (31%)
2	Y01	B	2201	-	38,38,38	1.13	3 (7%)	57,57,57	2.48	18 (31%)
2	Y01	C	2201	-	38,38,38	1.14	3 (7%)	57,57,57	2.48	18 (31%)
3	6OU	B	2004	-	36,36,48	1.03	4 (11%)	39,41,53	0.97	2 (5%)

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	6OU	D	2004	-	-	20/40/40/52	-
2	Y01	A	2002	-	-	7/19/77/77	0/4/4/4
3	6OU	A	2004	-	-	20/40/40/52	-
4	A1AIA	D	2101	-	-	1/9/27/27	0/2/2/2
2	Y01	B	2002	-	-	7/19/77/77	0/4/4/4
2	Y01	A	2201	-	-	15/19/77/77	0/4/4/4
4	A1AIA	B	2101	-	-	1/9/27/27	0/2/2/2
2	Y01	C	2002	-	-	7/19/77/77	0/4/4/4
4	A1AIA	A	2101	-	-	1/9/27/27	0/2/2/2
2	Y01	D	2002	-	-	7/19/77/77	0/4/4/4
3	6OU	C	2004	-	-	20/40/40/52	-
4	A1AIA	C	2101	-	-	1/9/27/27	0/2/2/2
2	Y01	D	2201	-	-	15/19/77/77	0/4/4/4
2	Y01	B	2201	-	-	15/19/77/77	0/4/4/4
2	Y01	C	2201	-	-	15/19/77/77	0/4/4/4
3	6OU	B	2004	-	-	20/40/40/52	-

The worst 5 of 76 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	2101	A1AIA	C04-N06	16.16	1.45	1.33
4	D	2101	A1AIA	C04-N06	16.16	1.45	1.33
4	A	2101	A1AIA	C04-N06	16.05	1.45	1.33
4	C	2101	A1AIA	C04-N06	16.05	1.45	1.33
4	A	2101	A1AIA	C09-N08	15.45	1.45	1.33

The worst 5 of 137 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	2002	Y01	CAT-CBH-CBF	-9.55	96.09	108.74
2	A	2002	Y01	CAT-CBH-CBF	-9.54	96.12	108.74
2	B	2002	Y01	CAT-CBH-CBF	-9.54	96.12	108.74
2	D	2002	Y01	CAT-CBH-CBF	-9.54	96.12	108.74
2	A	2201	Y01	CAT-CBH-CBF	-8.28	97.78	108.74

There are no chirality outliers.

5 of 172 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	2004	6OU	C21-O22-P23-O24

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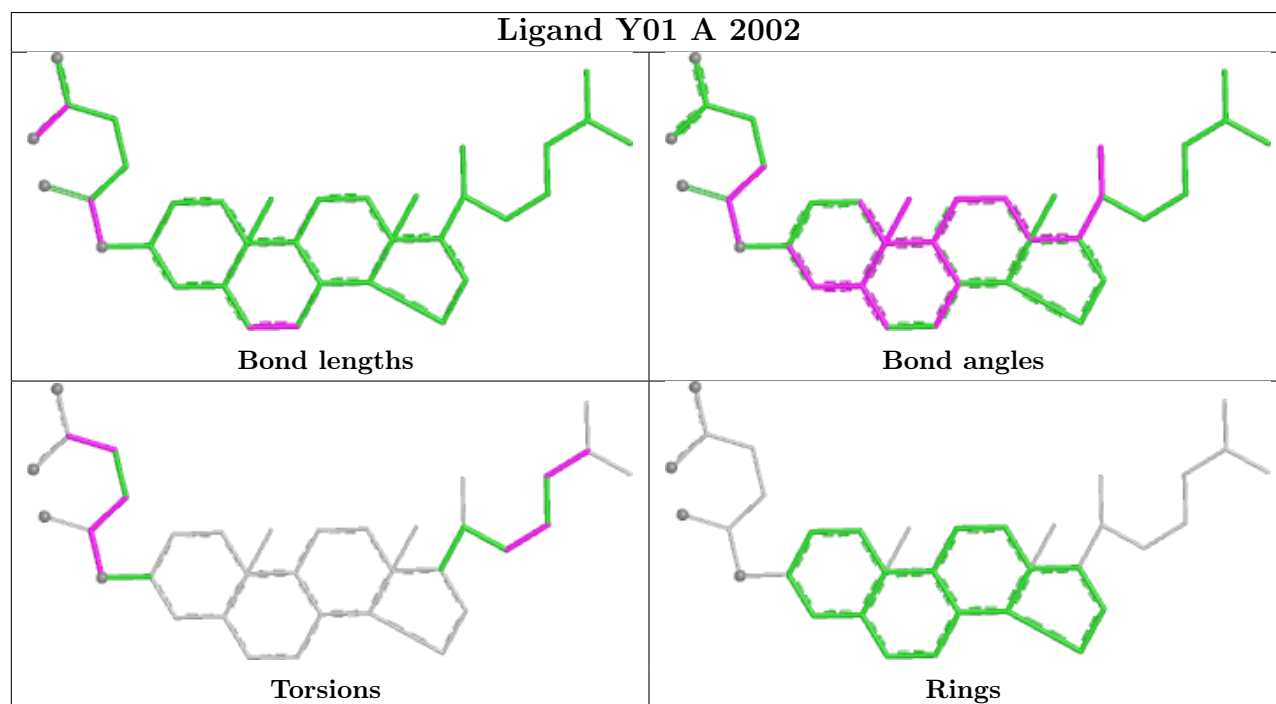
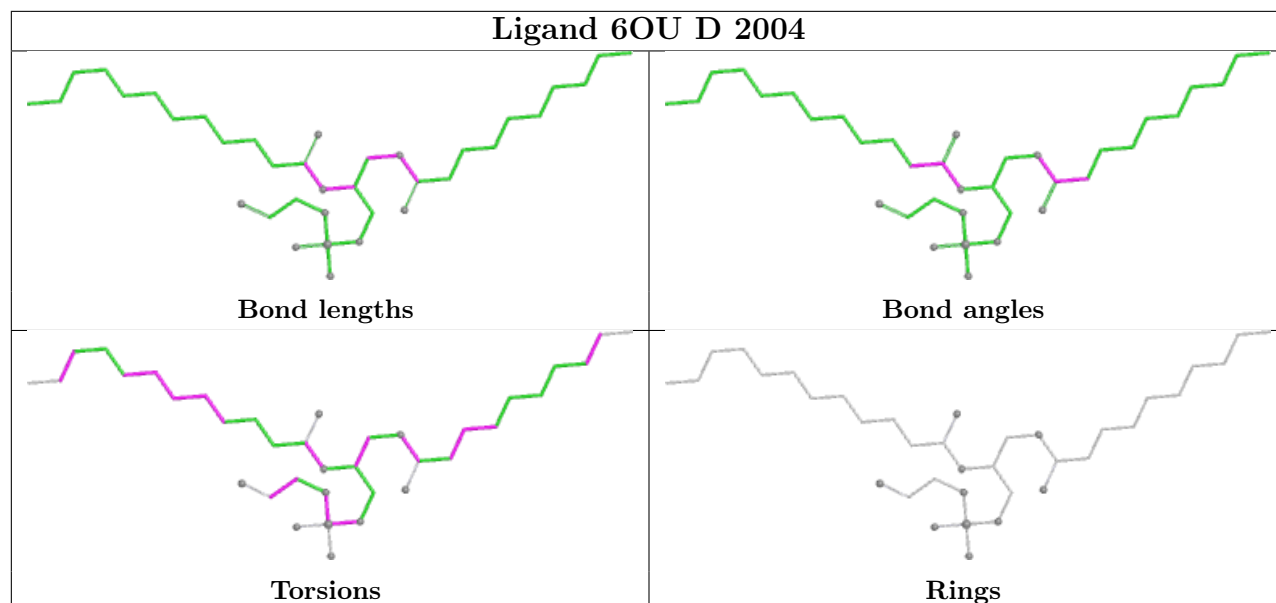
Mol	Chain	Res	Type	Atoms
3	A	2004	6OU	C21-O22-P23-O26
3	A	2004	6OU	O26-C27-C28-N29
3	A	2004	6OU	O32-C31-O30-C20
3	C	2004	6OU	C21-O22-P23-O24

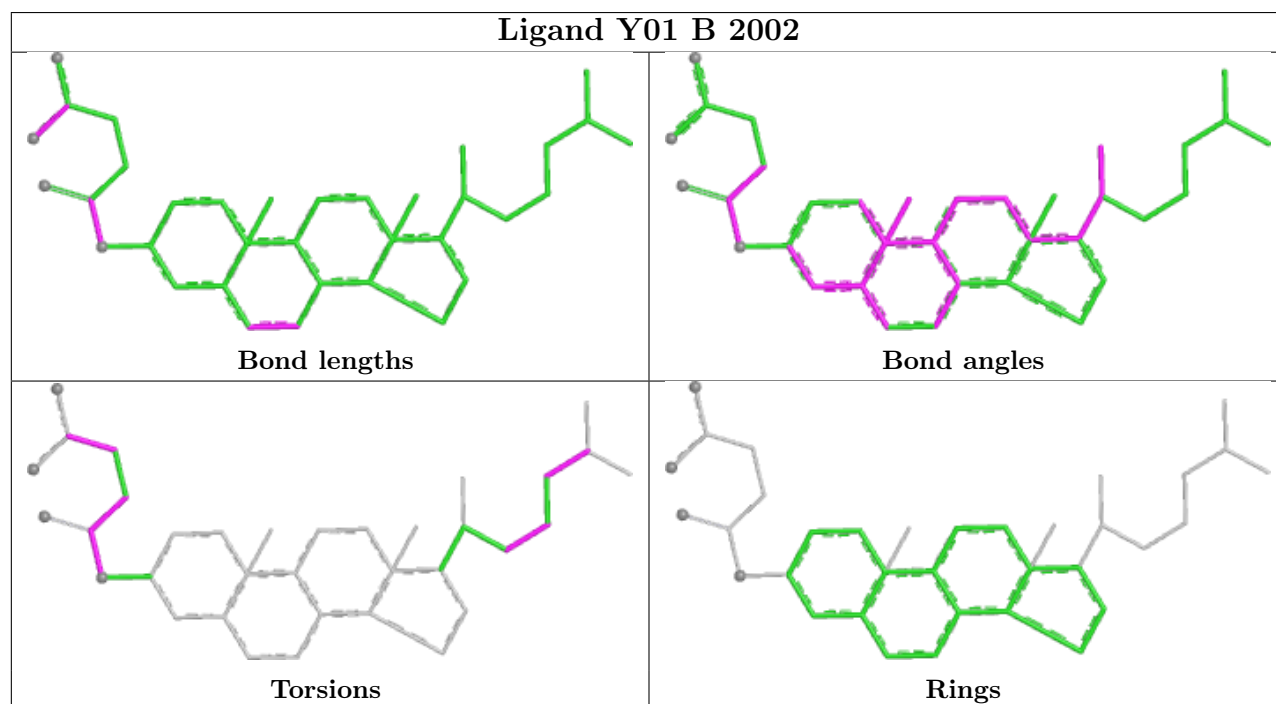
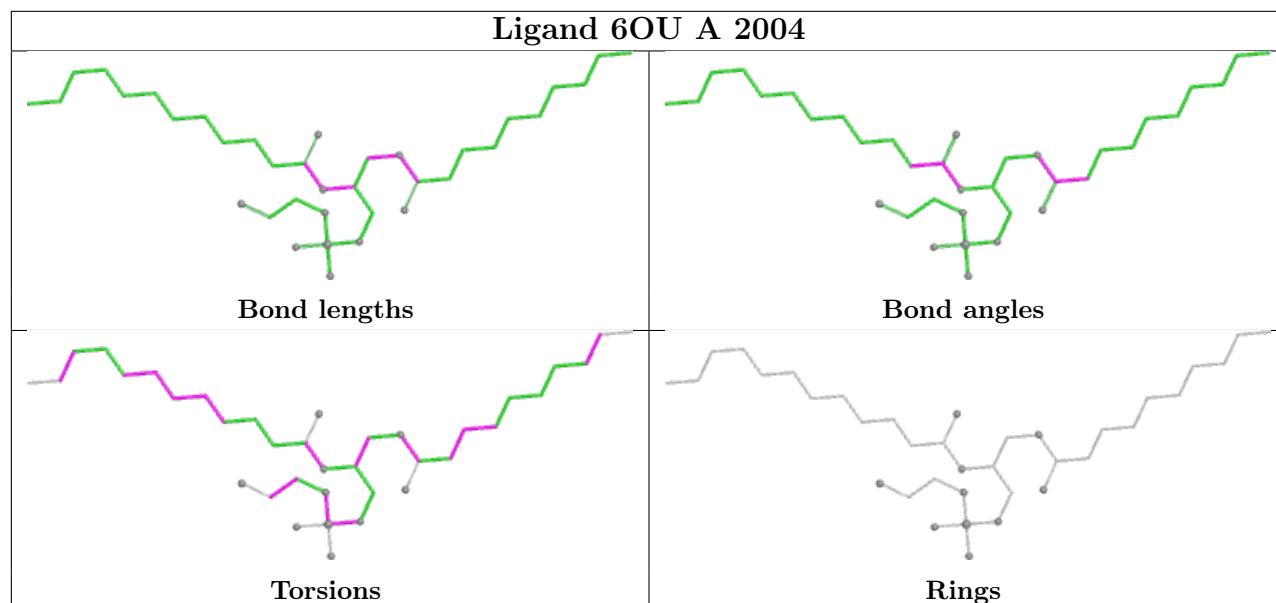
There are no ring outliers.

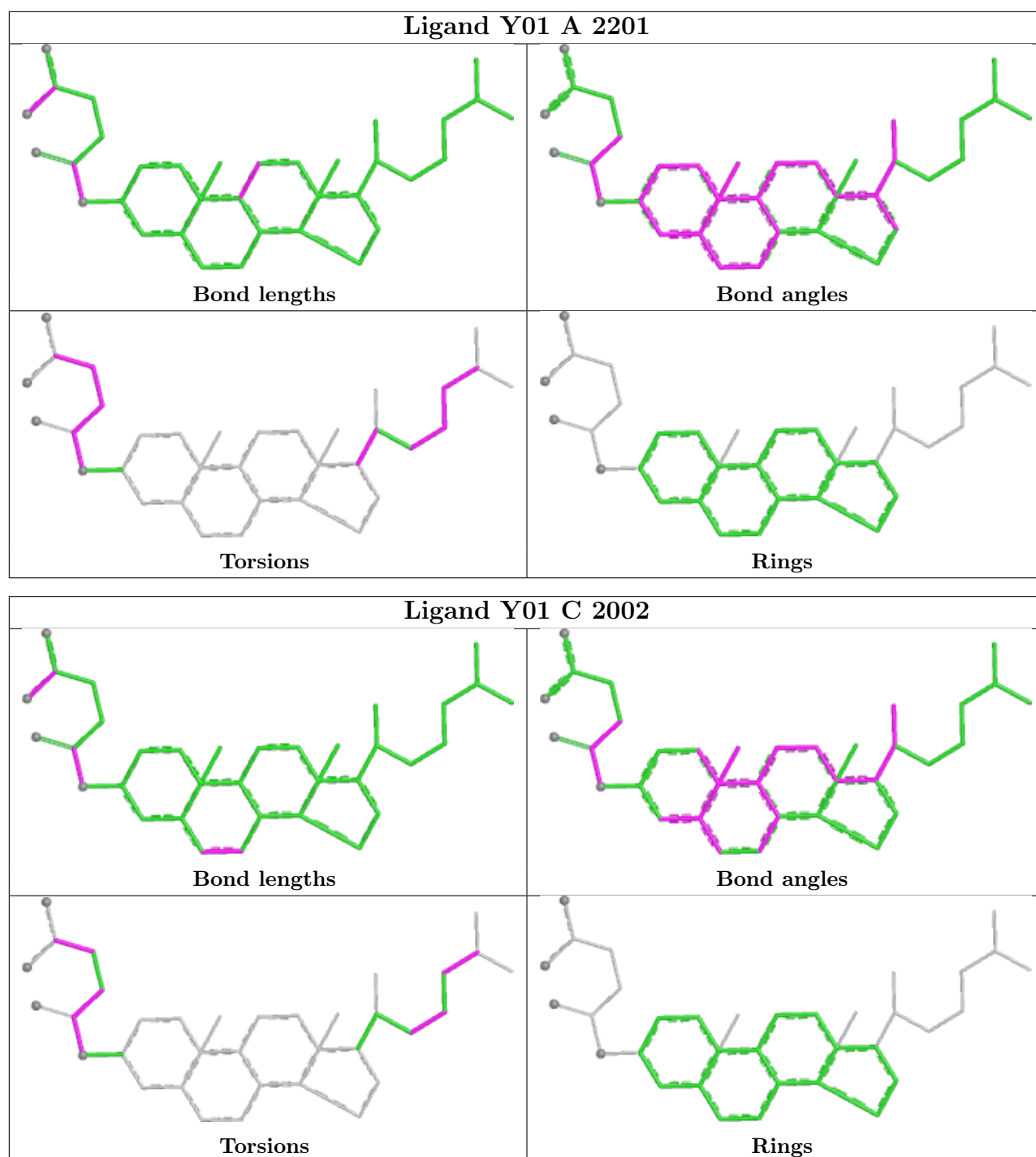
8 monomers are involved in 9 short contacts:

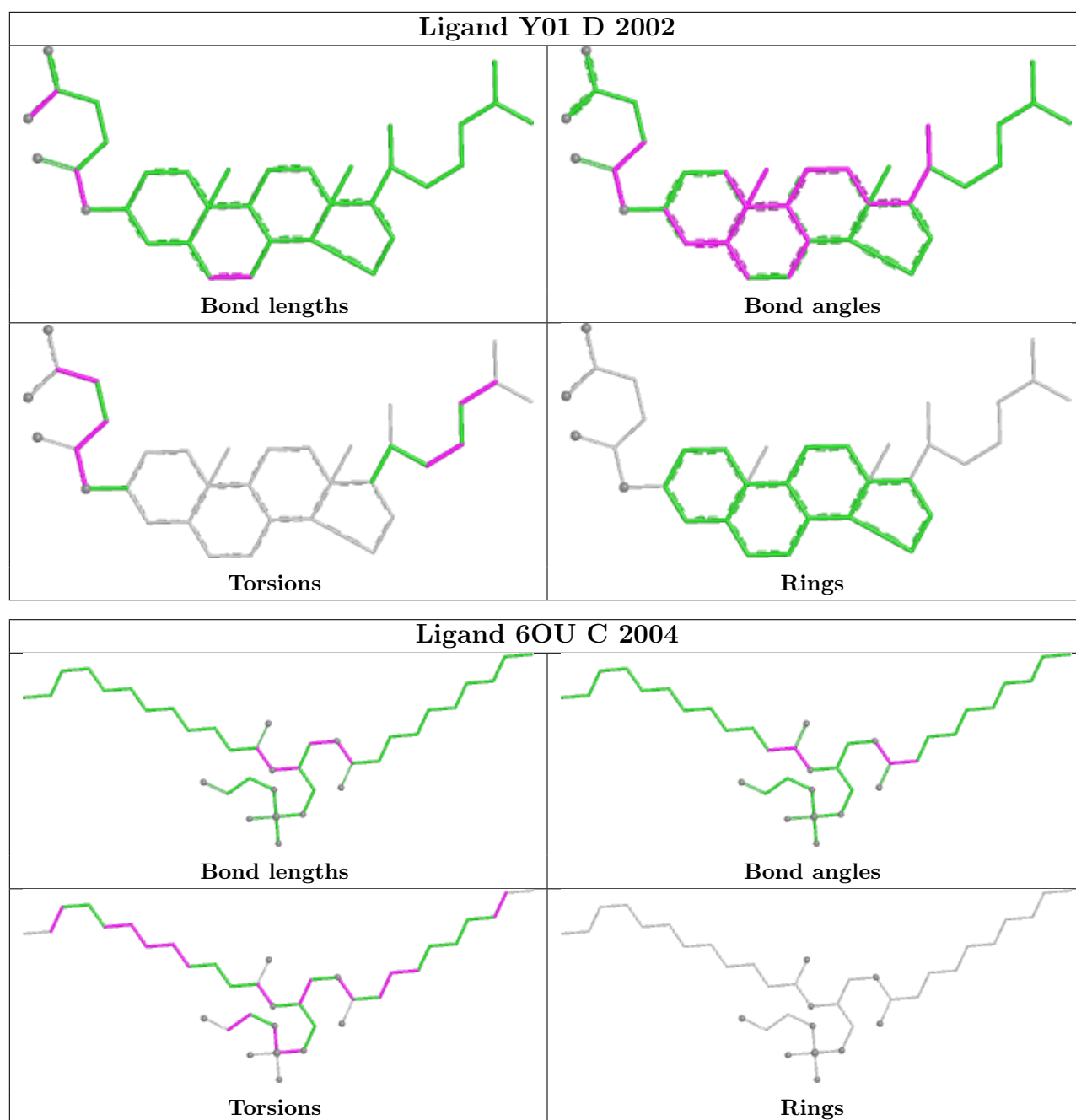
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	2002	Y01	1	0
2	B	2002	Y01	1	0
2	A	2201	Y01	1	0
2	C	2002	Y01	1	0
2	D	2002	Y01	1	0
2	D	2201	Y01	2	0
2	B	2201	Y01	1	0
2	C	2201	Y01	1	0

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

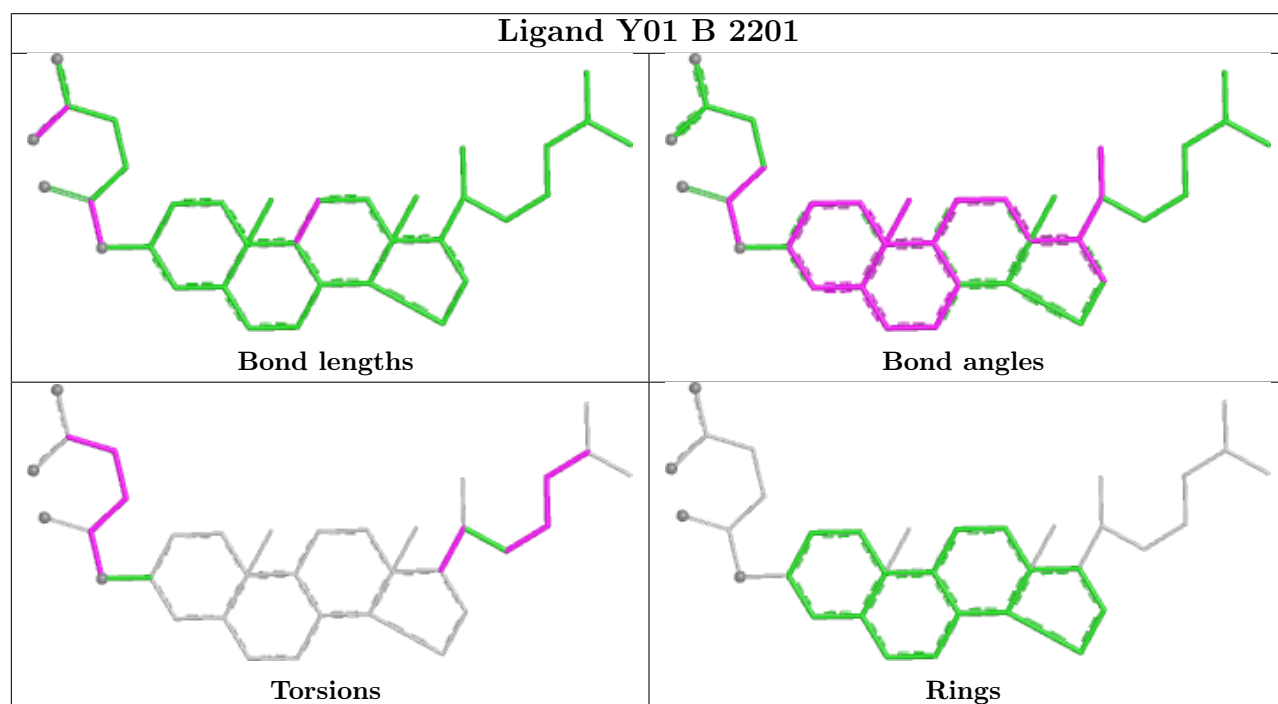
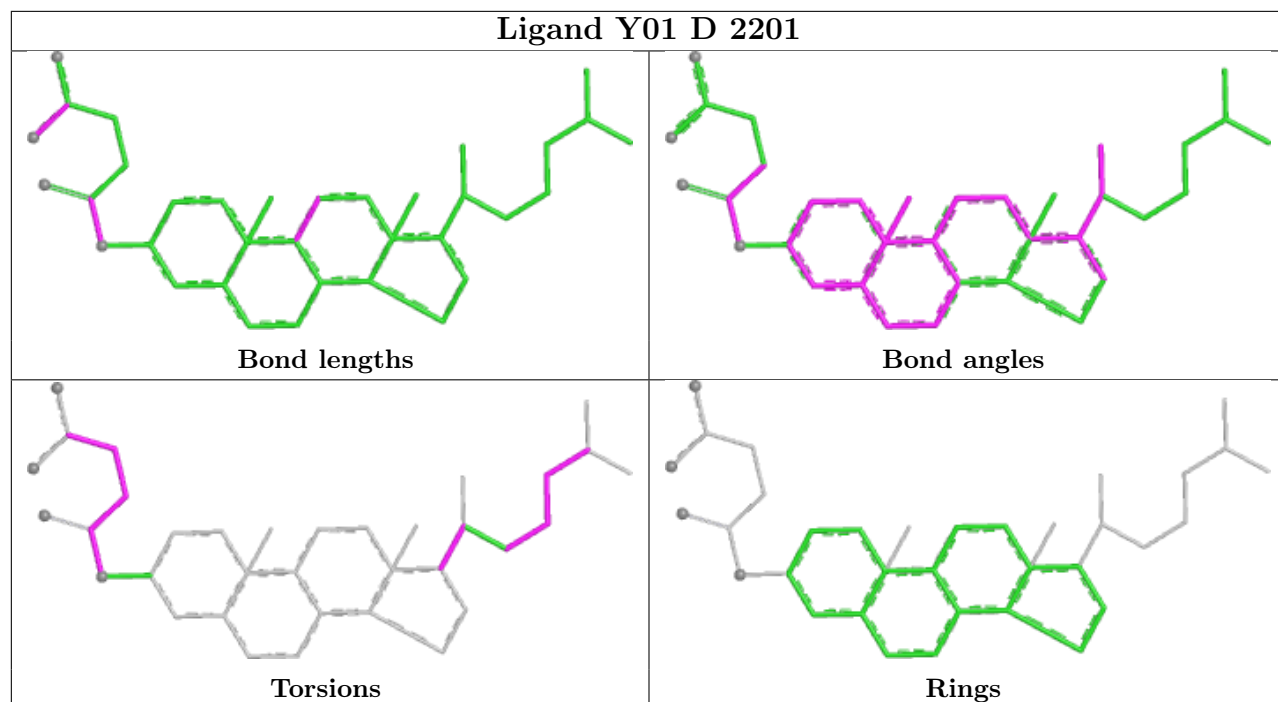


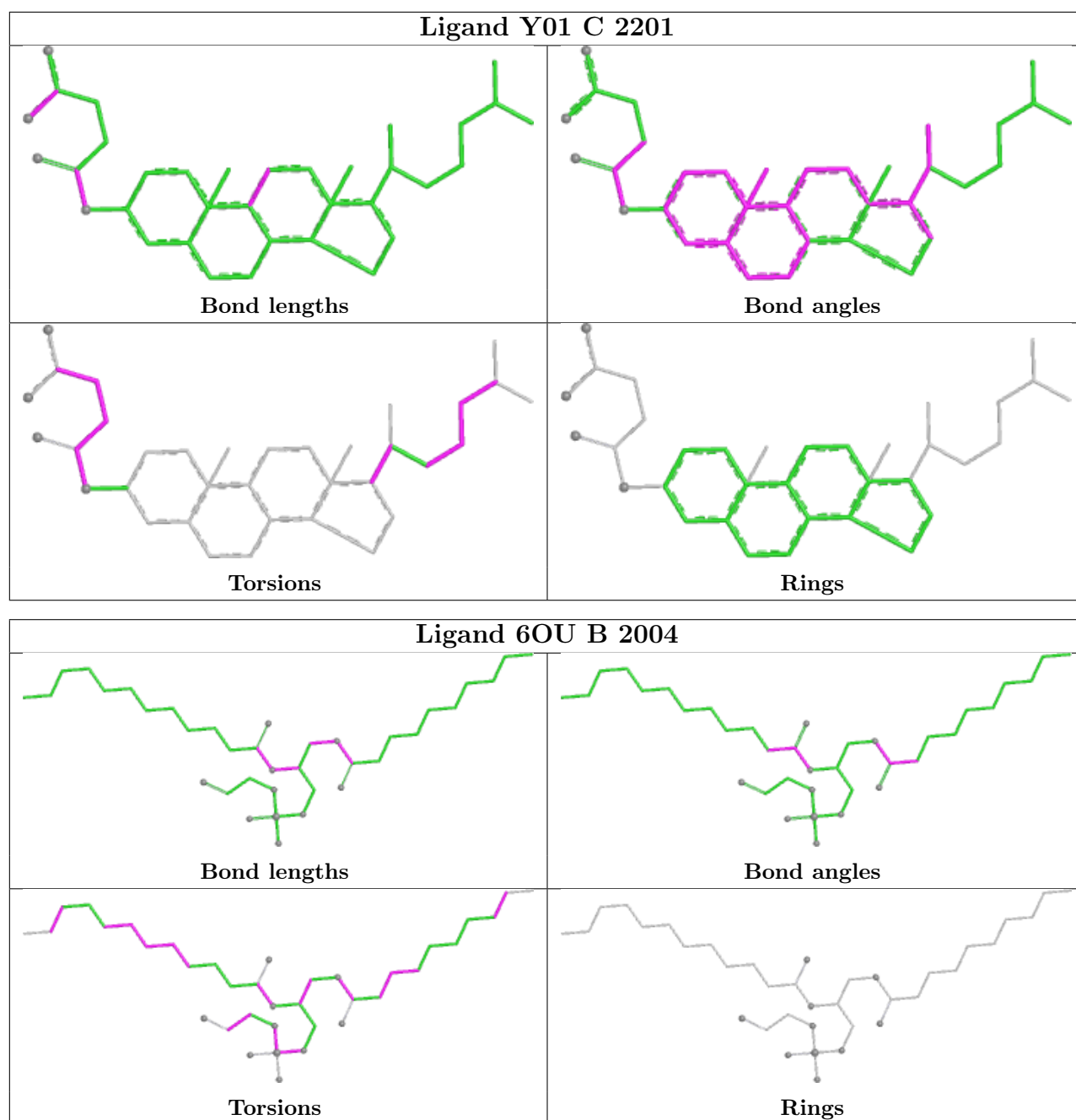












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

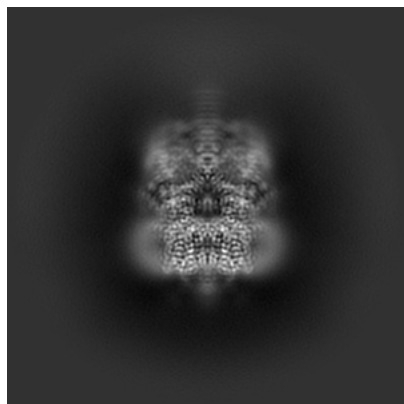
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-44100. These allow visual inspection of the internal detail of the map and identification of artifacts.

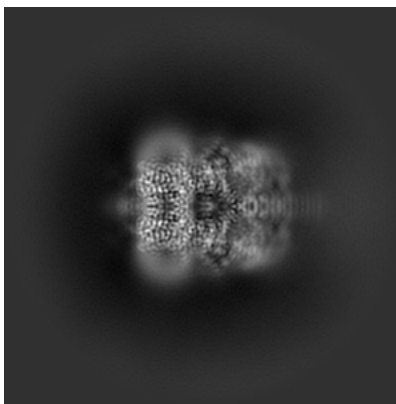
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

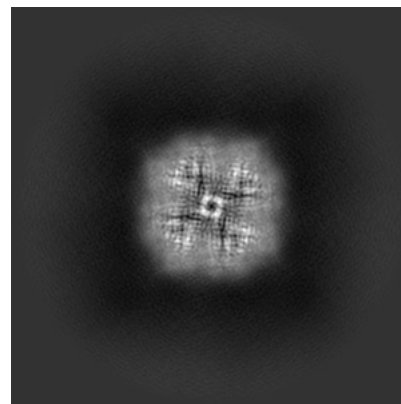
#### 6.1.1 Primary map



X

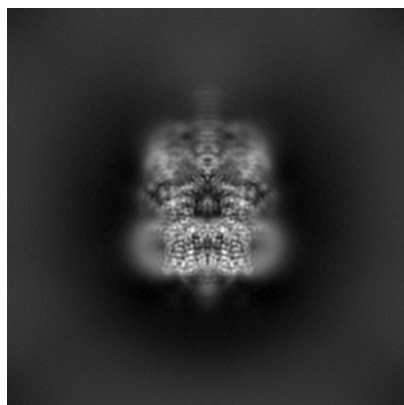


Y

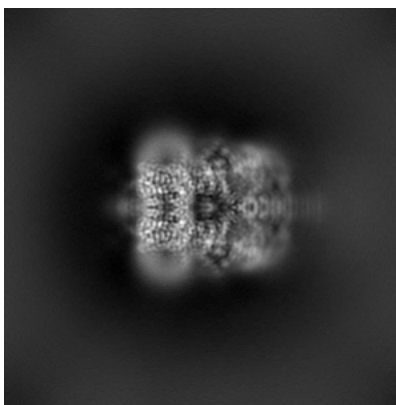


Z

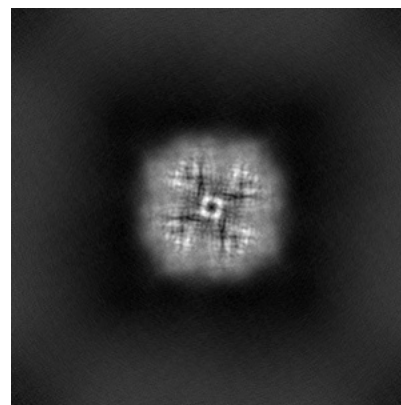
#### 6.1.2 Raw map



X



Y

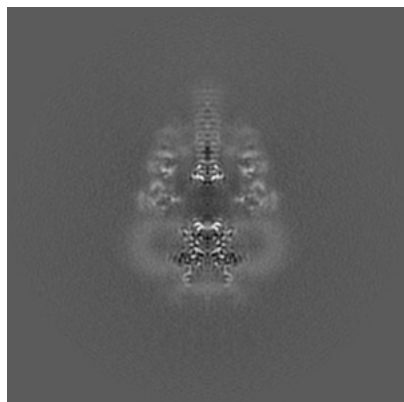


Z

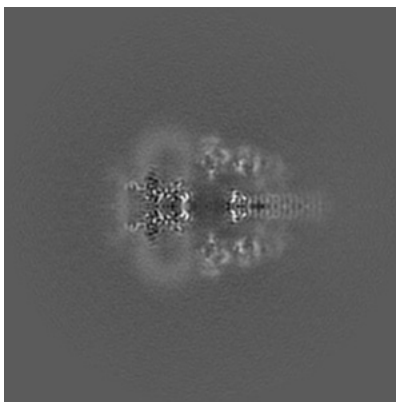
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

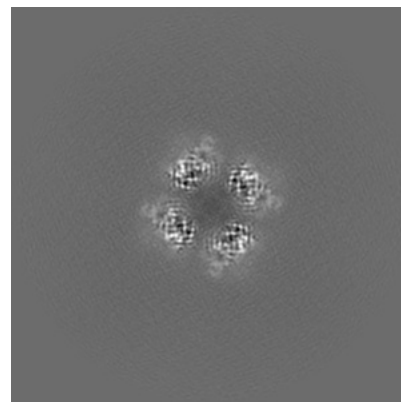
### 6.2.1 Primary map



X Index: 160

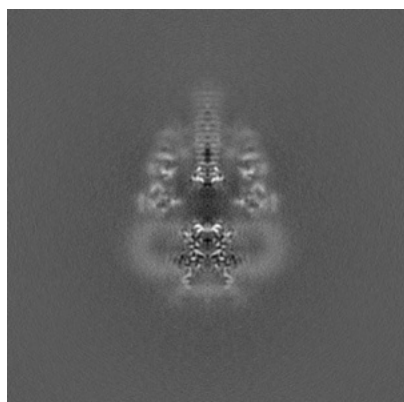


Y Index: 160

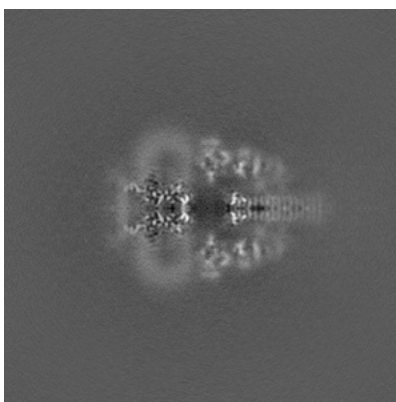


Z Index: 160

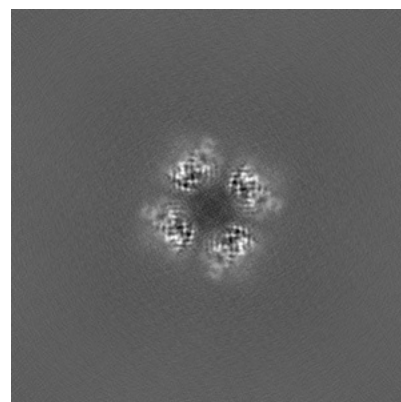
### 6.2.2 Raw map



X Index: 160



Y Index: 160

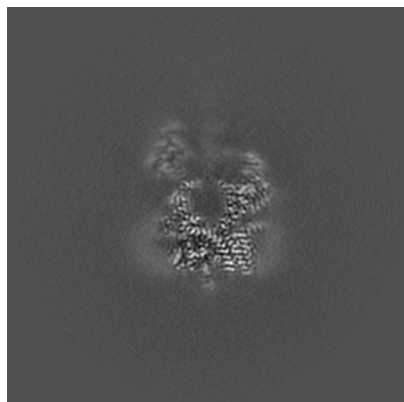


Z Index: 160

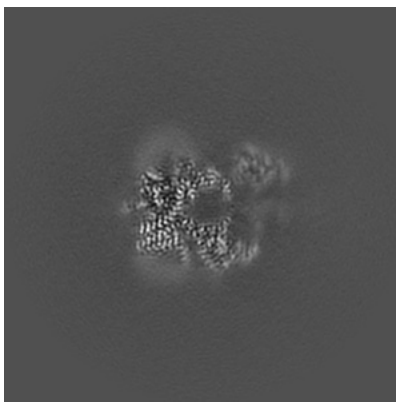
The images above show central slices of the map in three orthogonal directions.

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

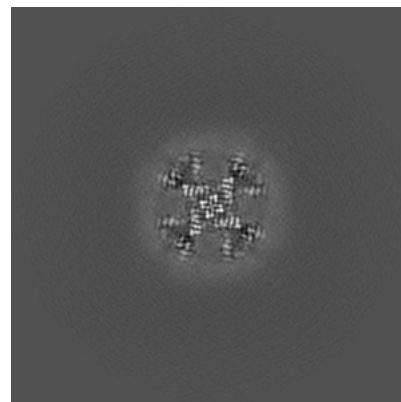
### 6.3.1 Primary map



X Index: 146

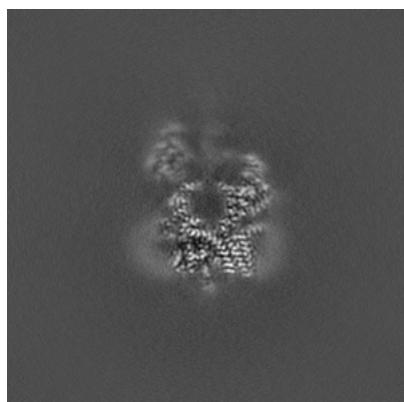


Y Index: 146

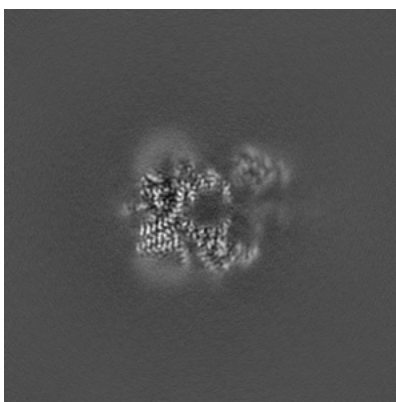


Z Index: 142

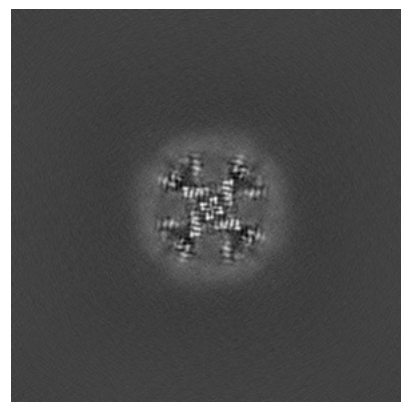
### 6.3.2 Raw map



X Index: 146



Y Index: 146

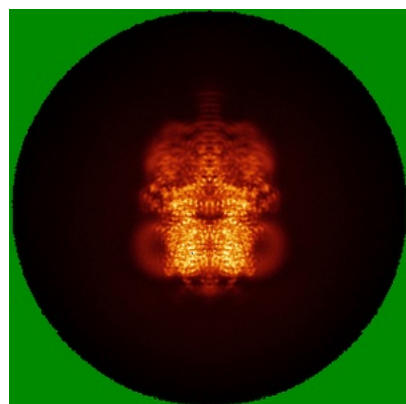


Z Index: 142

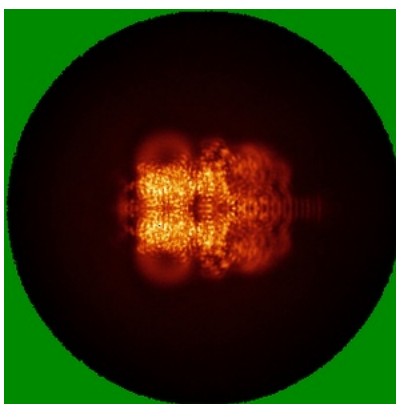
The images above show the largest variance slices of the map in three orthogonal directions.

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

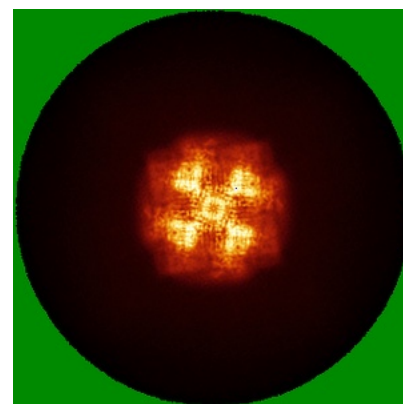
### 6.4.1 Primary map



X

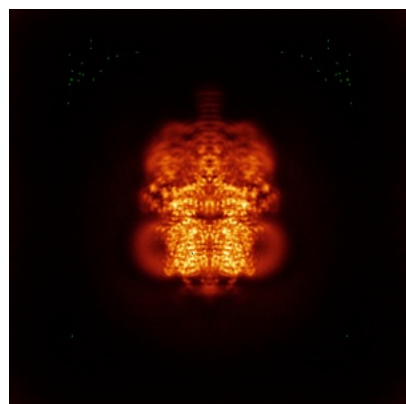


Y

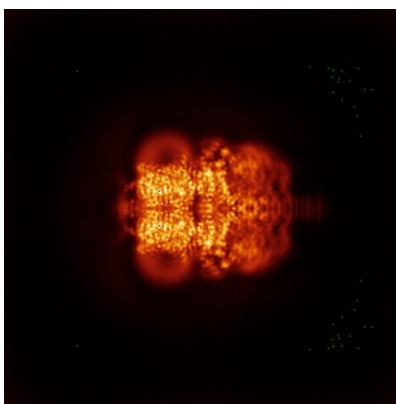


Z

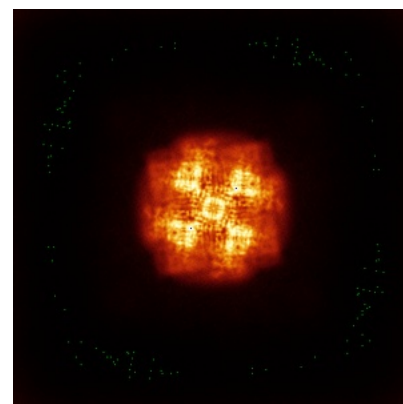
### 6.4.2 Raw map



X



Y

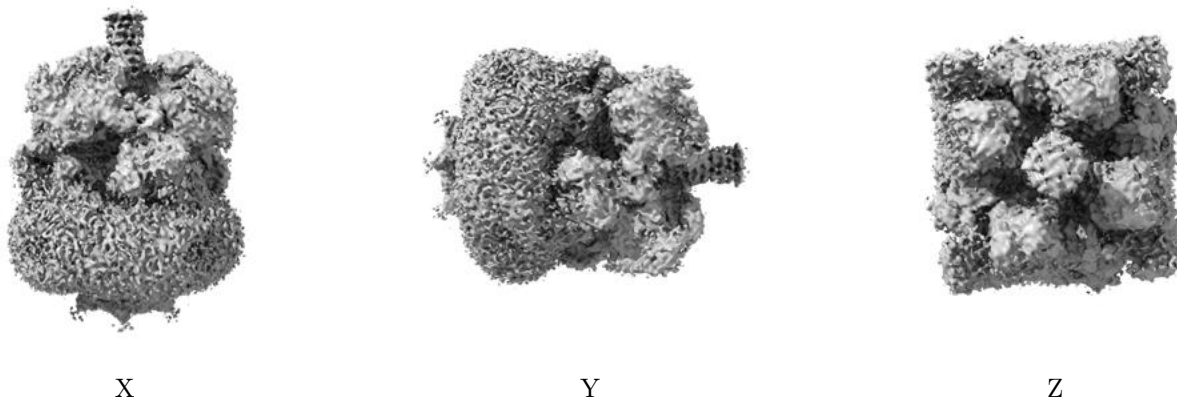


Z

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.

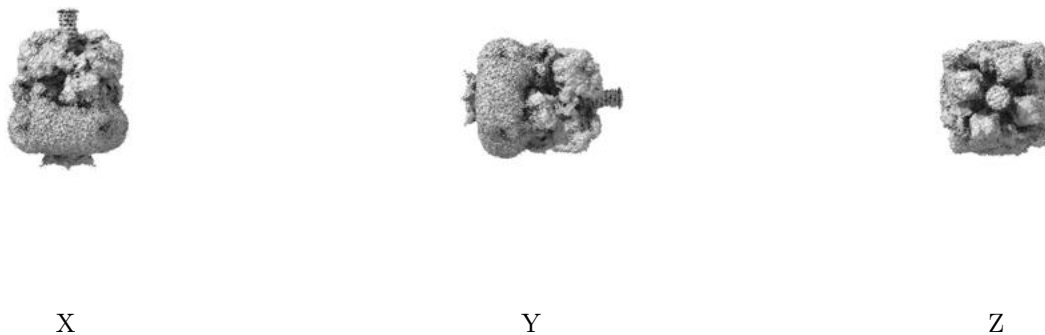
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.1. 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.

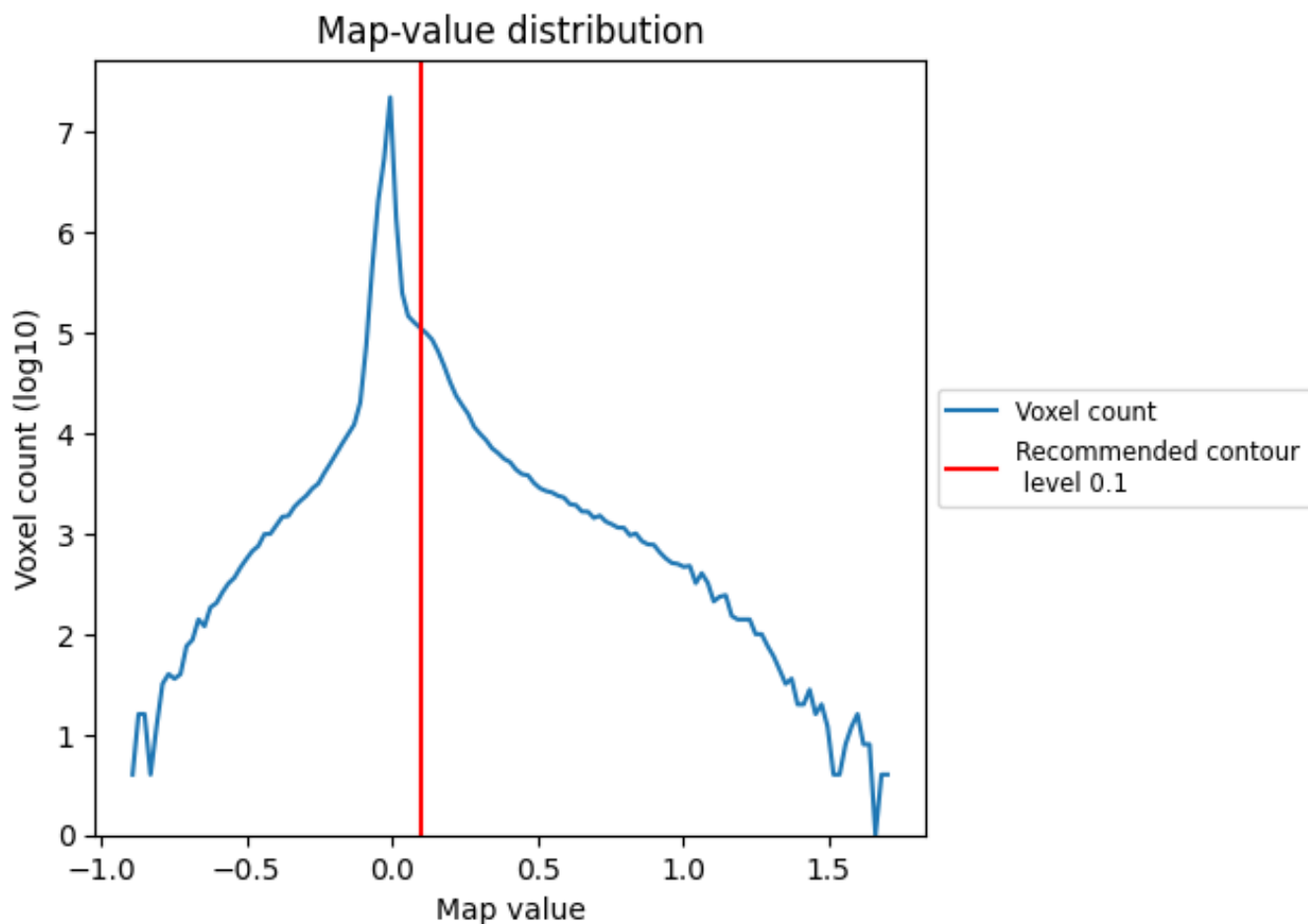
## 6.6 Mask visualisation [i](#)

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.

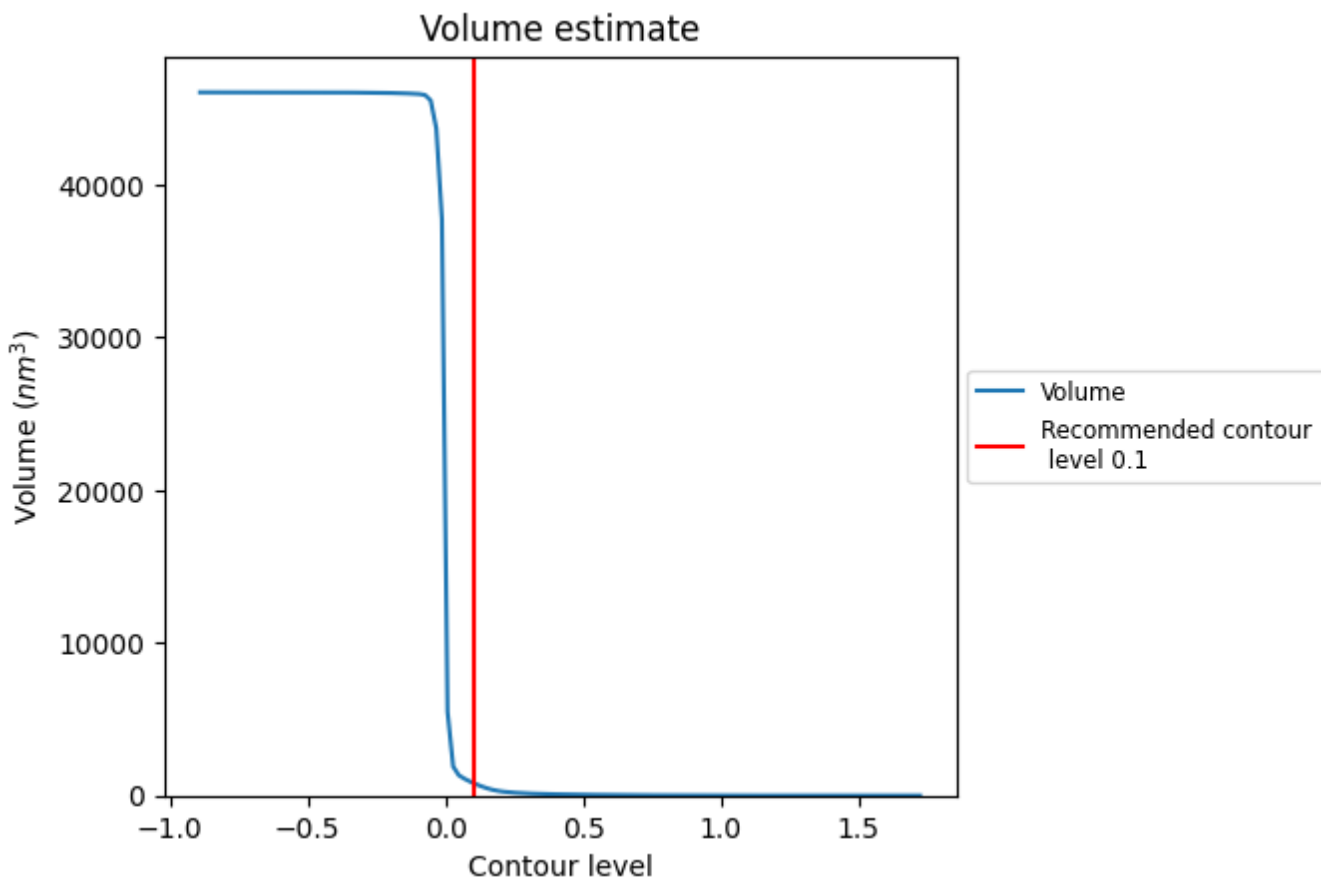
### 7.1 Map-value distribution [i](#)



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.



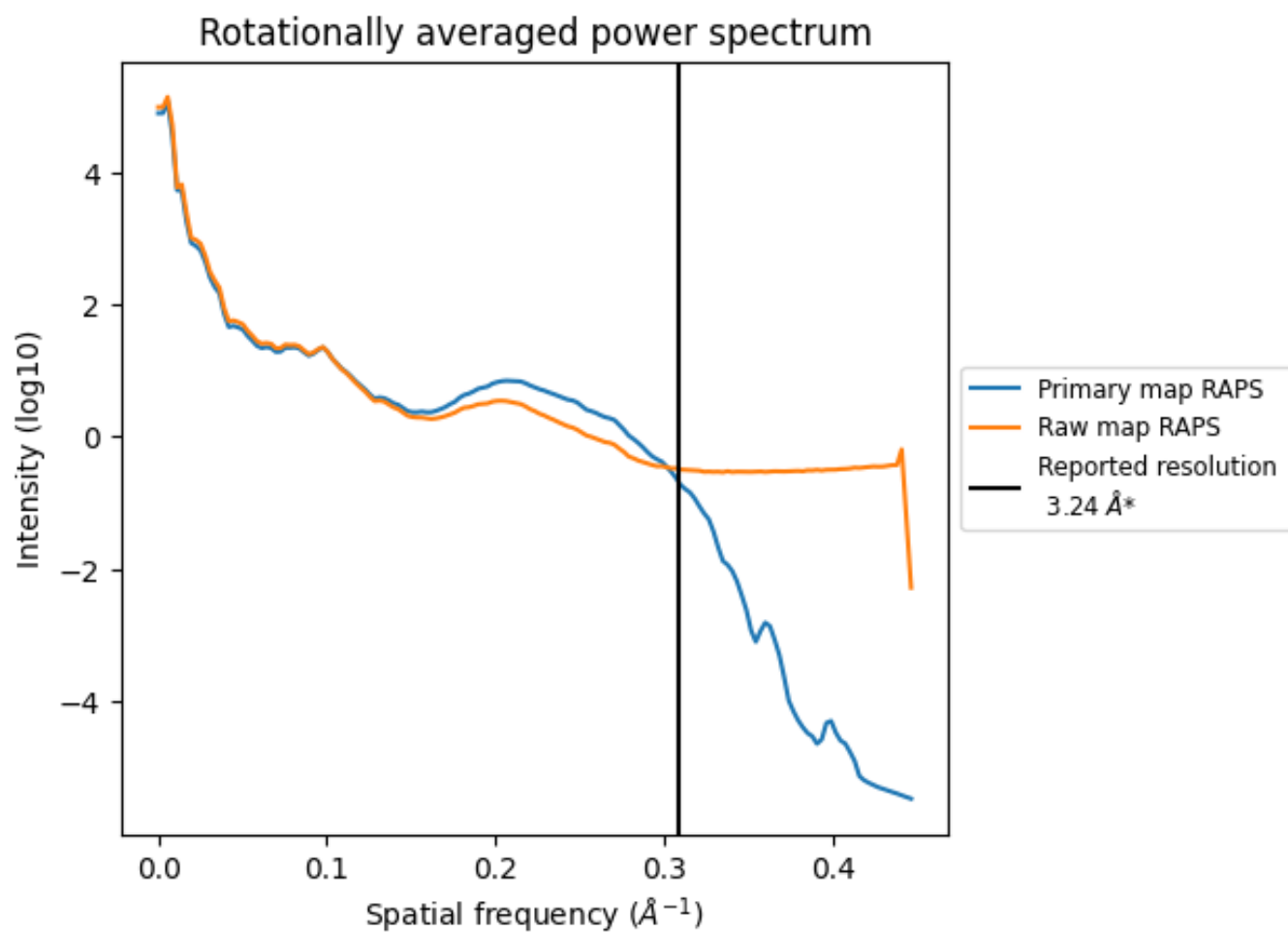
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 834  $\text{nm}^3$ ; this corresponds to an approximate mass of 753 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

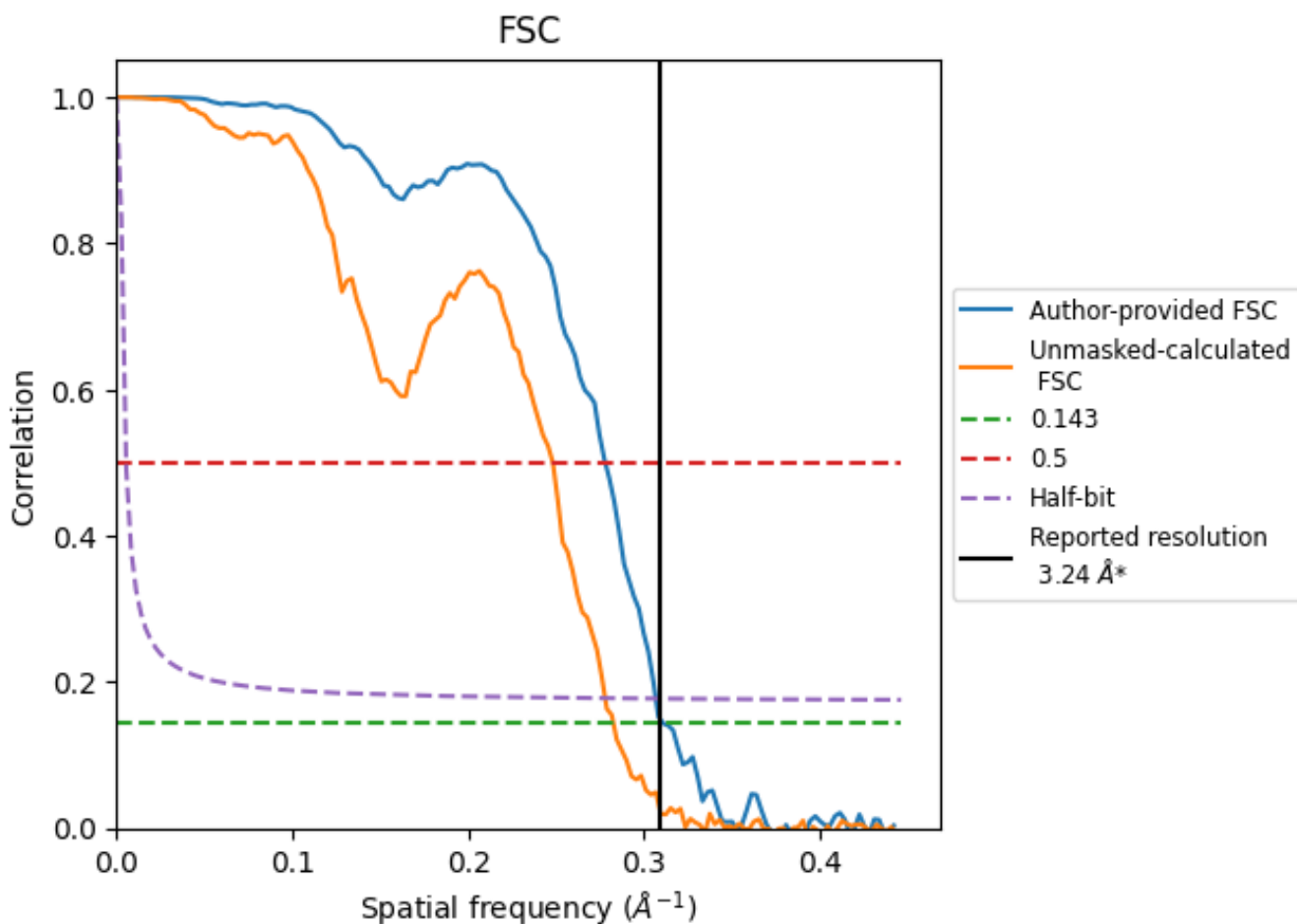


\*Reported resolution corresponds to spatial frequency of 0.309 Å<sup>-1</sup>

## 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  $0.309 \text{\AA}^{-1}$

## 8.2 Resolution estimates [i](#)

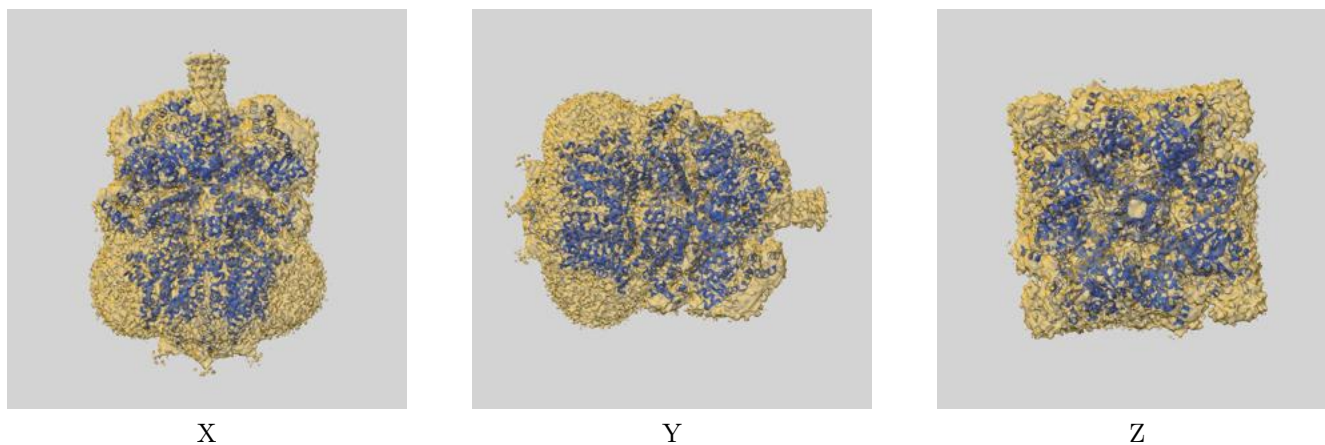
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.24	-	-
Author-provided FSC curve	3.21	3.60	3.26
Unmasked-calculated*	3.54	4.03	3.60

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

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

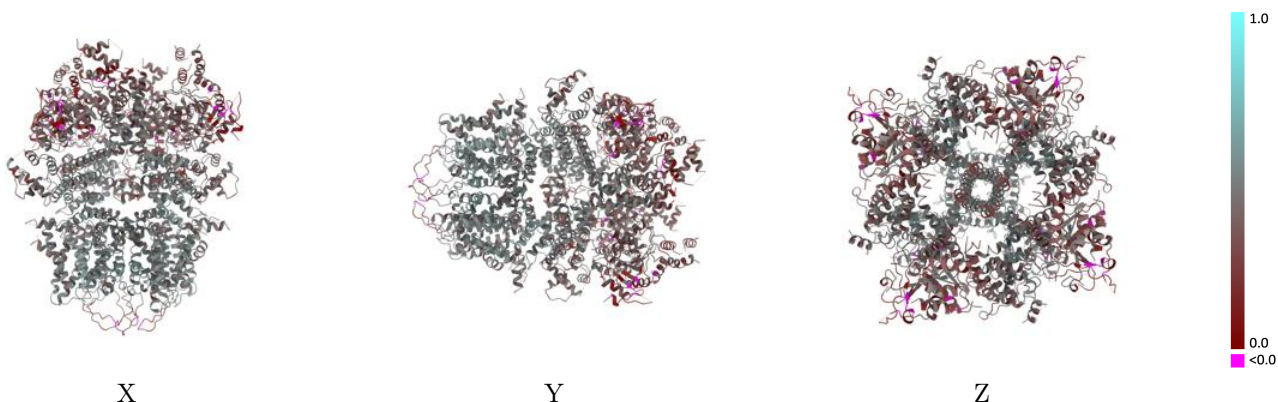
This section contains information regarding the fit between EMDB map EMD-44100 and PDB model 9B28. Per-residue inclusion information can be found in section 3 on page 9.

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



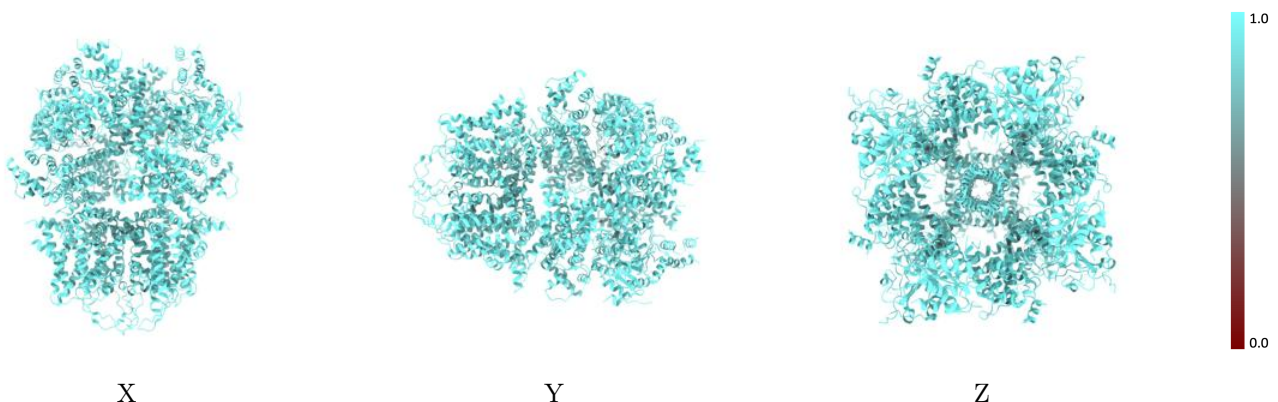
The images above show the 3D surface view of the map at the recommended contour level 0.1 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



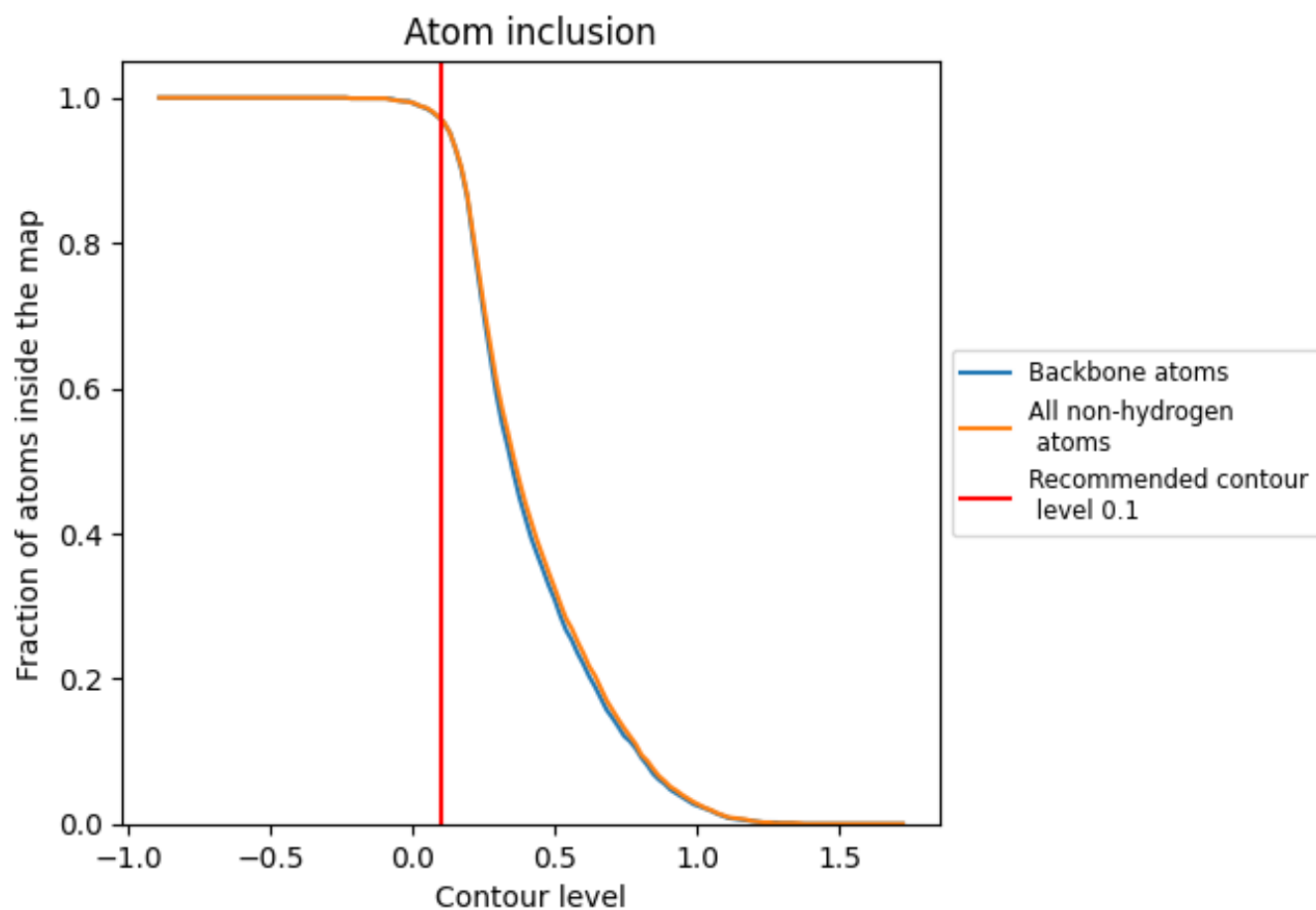
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.1).











## 9.4 Atom inclusion [i](#)



At the recommended contour level, 97% of all backbone atoms, 97% 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 (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9700	 0.4380
A	 0.9710	 0.4380
B	 0.9700	 0.4380
C	 0.9700	 0.4380
D	 0.9700	 0.4370

