



wwPDB EM Validation Summary Report ⓘ

Nov 12, 2022 – 08:09 AM EST

PDB ID : 6UGF
EMDB ID : EMD-20763
Title : Katanin hexamer in the ring conformation with resolved protomer one in complex with substrate
Authors : Zehr, E.A.; Roll-Mecak, A.
Deposited on : 2019-09-26
Resolution : 4.20 Å(reported)
Based on initial model : 5WC0

This is a wwPDB EM Validation Summary 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.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

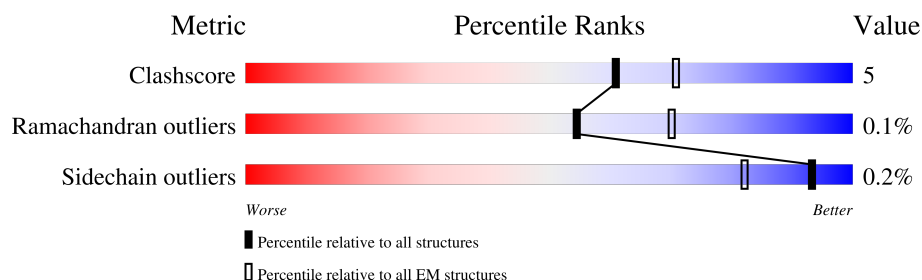
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 4.20 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 ≥ 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	490	<div> <div>28%</div> <div>54%</div> <div>8%</div> <div>38%</div> </div>
1	B	490	<div> <div>54%</div> <div>8%</div> <div>38%</div> </div>
1	C	490	<div> <div>56%</div> <div>7%</div> <div>37%</div> </div>
1	D	490	<div> <div>56%</div> <div>8%</div> <div>37%</div> </div>
1	E	490	<div> <div>58%</div> <div>6%</div> <div>36%</div> </div>
1	F	490	<div> <div>57%</div> <div>6%</div> <div>37%</div> </div>
2	G	12	<div> <div>100%</div> </div>

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 13874 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 Meiotic spindle formation protein mei-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	304	Total	C	N	O	S	0	0
			2231	1424	390	406	11		
1	B	305	Total	C	N	O	S	0	0
			2273	1447	396	418	12		
1	C	308	Total	C	N	O	S	0	0
			2297	1461	406	419	11		
1	D	310	Total	C	N	O	S	0	0
			2318	1471	409	427	11		
1	E	312	Total	C	N	O	S	0	0
			2306	1467	410	418	11		
1	F	311	Total	C	N	O	S	0	0
			2186	1398	382	399	7		

There are 114 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-17	GLY	-	expression tag	UNP P34808
A	-16	SER	-	expression tag	UNP P34808
A	-15	PHE	-	expression tag	UNP P34808
A	-14	THR	-	expression tag	UNP P34808
A	-13	MET	-	expression tag	UNP P34808
A	-12	ALA	-	expression tag	UNP P34808
A	-11	SER	-	expression tag	UNP P34808
A	-10	MET	-	expression tag	UNP P34808
A	-9	THR	-	expression tag	UNP P34808
A	-8	GLY	-	expression tag	UNP P34808
A	-7	GLY	-	expression tag	UNP P34808
A	-6	GLN	-	expression tag	UNP P34808
A	-5	GLN	-	expression tag	UNP P34808
A	-4	MET	-	expression tag	UNP P34808
A	-3	GLY	-	expression tag	UNP P34808
A	-2	ARG	-	expression tag	UNP P34808
A	-1	GLY	-	expression tag	UNP P34808
A	0	SER	-	expression tag	UNP P34808

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Chain	Residue	Modelled	Actual	Comment	Reference
A	293	GLN	GLU	engineered mutation	UNP P34808
B	-17	GLY	-	expression tag	UNP P34808
B	-16	SER	-	expression tag	UNP P34808
B	-15	PHE	-	expression tag	UNP P34808
B	-14	THR	-	expression tag	UNP P34808
B	-13	MET	-	expression tag	UNP P34808
B	-12	ALA	-	expression tag	UNP P34808
B	-11	SER	-	expression tag	UNP P34808
B	-10	MET	-	expression tag	UNP P34808
B	-9	THR	-	expression tag	UNP P34808
B	-8	GLY	-	expression tag	UNP P34808
B	-7	GLY	-	expression tag	UNP P34808
B	-6	GLN	-	expression tag	UNP P34808
B	-5	GLN	-	expression tag	UNP P34808
B	-4	MET	-	expression tag	UNP P34808
B	-3	GLY	-	expression tag	UNP P34808
B	-2	ARG	-	expression tag	UNP P34808
B	-1	GLY	-	expression tag	UNP P34808
B	0	SER	-	expression tag	UNP P34808
B	293	GLN	GLU	engineered mutation	UNP P34808
C	-17	GLY	-	expression tag	UNP P34808
C	-16	SER	-	expression tag	UNP P34808
C	-15	PHE	-	expression tag	UNP P34808
C	-14	THR	-	expression tag	UNP P34808
C	-13	MET	-	expression tag	UNP P34808
C	-12	ALA	-	expression tag	UNP P34808
C	-11	SER	-	expression tag	UNP P34808
C	-10	MET	-	expression tag	UNP P34808
C	-9	THR	-	expression tag	UNP P34808
C	-8	GLY	-	expression tag	UNP P34808
C	-7	GLY	-	expression tag	UNP P34808
C	-6	GLN	-	expression tag	UNP P34808
C	-5	GLN	-	expression tag	UNP P34808
C	-4	MET	-	expression tag	UNP P34808
C	-3	GLY	-	expression tag	UNP P34808
C	-2	ARG	-	expression tag	UNP P34808
C	-1	GLY	-	expression tag	UNP P34808
C	0	SER	-	expression tag	UNP P34808
C	293	GLN	GLU	engineered mutation	UNP P34808
D	-17	GLY	-	expression tag	UNP P34808
D	-16	SER	-	expression tag	UNP P34808
D	-15	PHE	-	expression tag	UNP P34808

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-14	THR	-	expression tag	UNP P34808
D	-13	MET	-	expression tag	UNP P34808
D	-12	ALA	-	expression tag	UNP P34808
D	-11	SER	-	expression tag	UNP P34808
D	-10	MET	-	expression tag	UNP P34808
D	-9	THR	-	expression tag	UNP P34808
D	-8	GLY	-	expression tag	UNP P34808
D	-7	GLY	-	expression tag	UNP P34808
D	-6	GLN	-	expression tag	UNP P34808
D	-5	GLN	-	expression tag	UNP P34808
D	-4	MET	-	expression tag	UNP P34808
D	-3	GLY	-	expression tag	UNP P34808
D	-2	ARG	-	expression tag	UNP P34808
D	-1	GLY	-	expression tag	UNP P34808
D	0	SER	-	expression tag	UNP P34808
D	293	GLN	GLU	engineered mutation	UNP P34808
E	-17	GLY	-	expression tag	UNP P34808
E	-16	SER	-	expression tag	UNP P34808
E	-15	PHE	-	expression tag	UNP P34808
E	-14	THR	-	expression tag	UNP P34808
E	-13	MET	-	expression tag	UNP P34808
E	-12	ALA	-	expression tag	UNP P34808
E	-11	SER	-	expression tag	UNP P34808
E	-10	MET	-	expression tag	UNP P34808
E	-9	THR	-	expression tag	UNP P34808
E	-8	GLY	-	expression tag	UNP P34808
E	-7	GLY	-	expression tag	UNP P34808
E	-6	GLN	-	expression tag	UNP P34808
E	-5	GLN	-	expression tag	UNP P34808
E	-4	MET	-	expression tag	UNP P34808
E	-3	GLY	-	expression tag	UNP P34808
E	-2	ARG	-	expression tag	UNP P34808
E	-1	GLY	-	expression tag	UNP P34808
E	0	SER	-	expression tag	UNP P34808
E	293	GLN	GLU	engineered mutation	UNP P34808
F	-17	GLY	-	expression tag	UNP P34808
F	-16	SER	-	expression tag	UNP P34808
F	-15	PHE	-	expression tag	UNP P34808
F	-14	THR	-	expression tag	UNP P34808
F	-13	MET	-	expression tag	UNP P34808
F	-12	ALA	-	expression tag	UNP P34808
F	-11	SER	-	expression tag	UNP P34808

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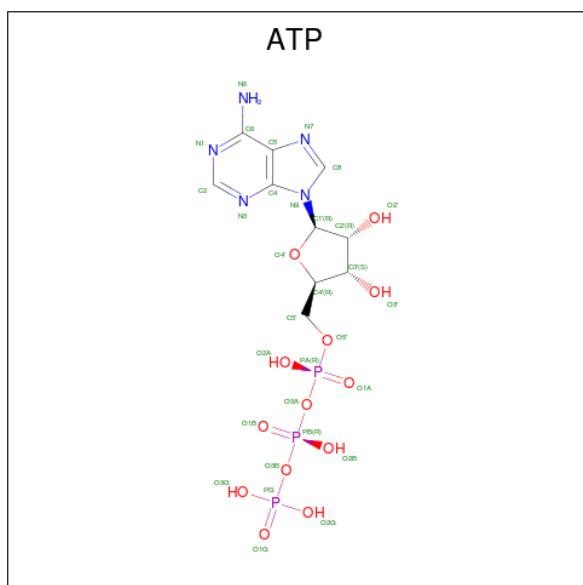
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Chain	Residue	Modelled	Actual	Comment	Reference
F	-10	MET	-	expression tag	UNP P34808
F	-9	THR	-	expression tag	UNP P34808
F	-8	GLY	-	expression tag	UNP P34808
F	-7	GLY	-	expression tag	UNP P34808
F	-6	GLN	-	expression tag	UNP P34808
F	-5	GLN	-	expression tag	UNP P34808
F	-4	MET	-	expression tag	UNP P34808
F	-3	GLY	-	expression tag	UNP P34808
F	-2	ARG	-	expression tag	UNP P34808
F	-1	GLY	-	expression tag	UNP P34808
F	0	SER	-	expression tag	UNP P34808
F	293	GLN	GLU	engineered mutation	UNP P34808

- Molecule 2 is a protein called Polyglutamate peptide.

Mol	Chain	Residues	Atoms				AltConf	Trace
2	G	12	Total	C	N	O	0	0
			104	58	12	34		

- Molecule 3 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
3	B	1	Total	C	N	O	P	0
			31	10	5	13	3	

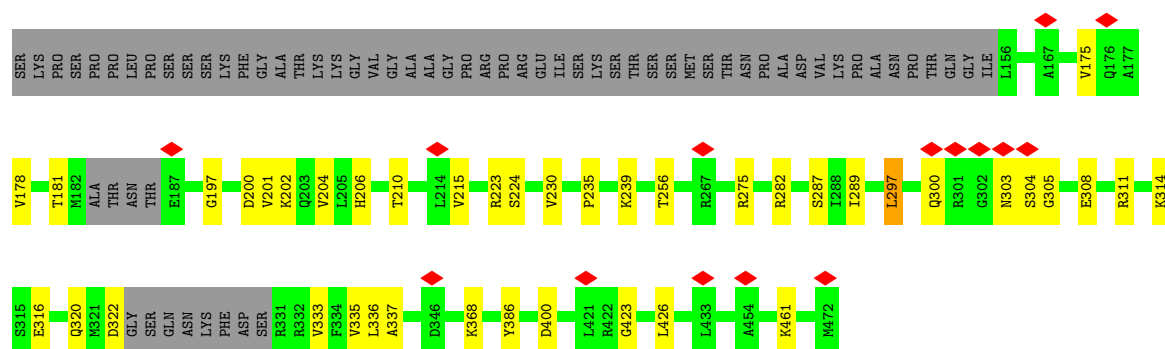
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Mol	Chain	Residues	Atoms					AltConf
3	C	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	D	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	E	1	Total	C	N	O	P	0
			31	10	5	13	3	
3	F	1	Total	C	N	O	P	0
			31	10	5	13	3	

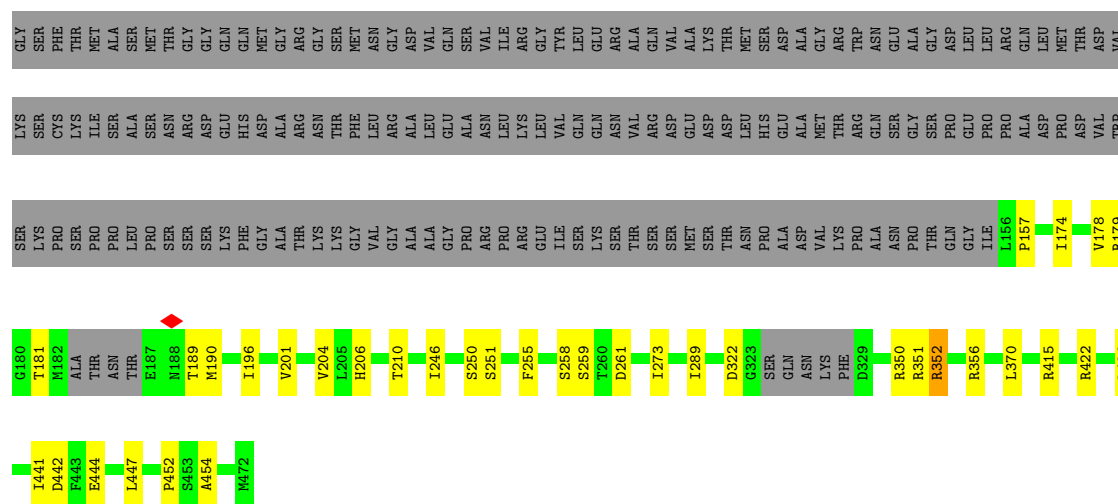
- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
4	B	1	Total	Mg	0
			1	1	
4	C	1	Total	Mg	0
			1	1	
4	D	1	Total	Mg	0
			1	1	
4	E	1	Total	Mg	0
			1	1	



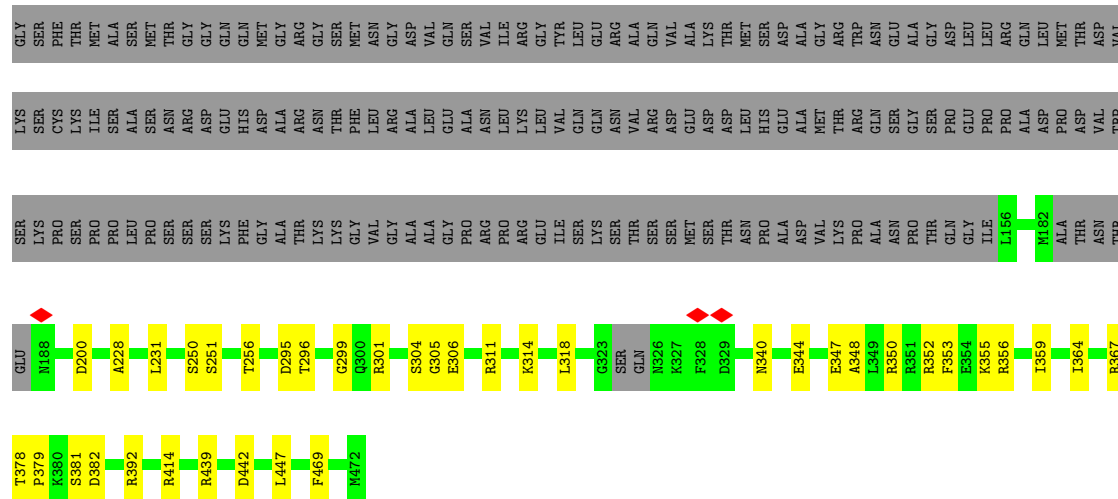
- Molecule 1: Meiotic spindle formation protein mei-1

Chain C: 56% 7% 37%



- Molecule 1: Meiotic spindle formation protein mei-1

Chain D: 56% 8% 37%



- Molecule 1: Meiotic spindle formation protein mei-1

GLU	M188	LYS	SER	LYS	SER	GLY
L132	PRO	SER	THR	PRO	PHE	THR
I196	PRO	PRO	MET	ILE	ILE	MET
D200	LEU	LEU	ALA	SER	ALA	ALA
V201	PRO	SER	SER	ASN	SER	THR
K202	SER	SER	ARG	ASP	GLY	GLY
E207	LYS	LYS	GLU	ASP	GLN	GLN
A228	PHE	GLY	ASP	HIS	GLN	GLN
L241	ALA	ALA	ALA	ALA	MET	GLY
S250	THR	LYS	ARG	ASN	ARG	ARG
S251	LYS	LYS	THR	ASN	GLY	GLY
S252	GLY	GLY	PHE	LEU	ASN	MET
T253	ALA	GLY	ARG	ARG	GLY	GLY
L260	ALA	ALA	LEU	VAL	ASP	ASP
P266	PRO	GLY	GLU	GLU	VAL	GLN
S287	ARG	ARG	ASN	ASN	SER	SER
I294	PRO	PRO	LEU	LEU	ILE	VAL
G299	ARG	GLY	LEU	LEU	LYS	ARG
R301	LYS	ILE	VAL	VAL	GLY	TYR
R311	SER	SER	GLN	GLN	LEU	LEU
K314	SER	SER	ARG	ASP	ALA	ALA
S315	MET	MET	ASP	GLU	VAL	VAL
S324	SER	SER	ASP	ASP	LYS	LYS
T339	THR	THR	ASN	LEU	THR	THR
F353	ASN	ASN	HIS	ASP	MET	MET
L361	ALA	ALA	GLU	ALA	THR	ARG
R367	PRO	ALA	SER	GLN	ASP	TRP
T393	ASN	ASN	GLY	ASP	ASN	GLU
S397	PRO	PRO	GLY	PRO	ALA	ALA
R406	GLN	GLN	GLU	ASP	GLY	GLY
M472	ILE	ILE	PRO	PRO	LEU	LEU
	L156	L156	PRO	ALA	ARG	ARG
	M152	M152	ASP	ALA	GLN	GLN
	ALA	ALA	PRO	LEU	LEU	LEU
	THR	THR	ASP	THR	MET	MET
	ASN	ASN	VAL	VAL	THR	THR
	THR	THR	THR	THR	VAL	VAL

Chain F: 57% 6% 37%

[illegible]

Chain G: 100%

There are no outlier residues recorded for this chain.

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	111285	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 ($e^-/\text{\AA}^2$)	73	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2800	Depositor
Magnification	130000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	23.936	Depositor
Minimum map value	-10.897	Depositor
Average map value	0.000	Depositor
Map value standard deviation	1.000	Depositor
Recommended contour level	5.22	Depositor
Map size (Å)	241.92001, 241.92001, 241.92001	wwPDB
Map dimensions	224, 224, 224	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.08, 1.08, 1.08	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: MG, ATP

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	0.31	0/2272	0.56	0/3083
1	B	0.35	0/2314	0.57	1/3134 (0.0%)
1	C	0.40	0/2338	0.52	0/3166
1	D	0.44	0/2359	0.54	0/3195
1	E	0.41	0/2348	0.54	0/3183
1	F	0.38	0/2227	0.54	0/3036
2	G	0.45	0/103	0.43	0/136
All	All	0.38	0/13961	0.54	1/18933 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	297	LEU	CA-CB-CG	6.94	131.26	115.30

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	2231	0	2152	24	0
1	B	2273	0	2223	27	0
1	C	2297	0	2254	20	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	D	2318	0	2265	24	0
1	E	2306	0	2245	21	0
1	F	2186	0	2019	20	0
2	G	104	0	67	0	0
3	B	31	0	12	1	0
3	C	31	0	12	0	0
3	D	31	0	12	0	0
3	E	31	0	12	2	0
3	F	31	0	12	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
4	E	1	0	0	0	0
All	All	13874	0	13285	126	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 5.

The worst 5 of 126 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:B:316:GLU:O	1:B:320:GLN:HB2	1.80	0.82
1:D:347:GLU:HG2	1:D:350:ARG:HH21	1.57	0.68
1:F:318:LEU:O	1:F:352:ARG:NH2	2.32	0.62
1:E:367:ARG:NH1	1:E:393:THR:O	2.34	0.60
1:B:282:ARG:NH2	1:B:322:ASP:O	2.35	0.60

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	298/490 (61%)	284 (95%)	14 (5%)	0	100	100
1	B	299/490 (61%)	277 (93%)	22 (7%)	0	100	100
1	C	302/490 (62%)	282 (93%)	20 (7%)	0	100	100
1	D	304/490 (62%)	288 (95%)	16 (5%)	0	100	100
1	E	308/490 (63%)	290 (94%)	18 (6%)	0	100	100
1	F	305/490 (62%)	284 (93%)	19 (6%)	2 (1%)	22	62
2	G	10/12 (83%)	10 (100%)	0	0	100	100
All	All	1826/2952 (62%)	1715 (94%)	109 (6%)	2 (0%)	54	85

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	F	157	PRO
1	F	379	PRO

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	214/407 (53%)	213 (100%)	1 (0%)	88	93
1	B	227/407 (56%)	227 (100%)	0	100	100
1	C	228/407 (56%)	227 (100%)	1 (0%)	91	94
1	D	231/407 (57%)	231 (100%)	0	100	100
1	E	224/407 (55%)	224 (100%)	0	100	100
1	F	194/407 (48%)	193 (100%)	1 (0%)	88	93
2	G	11/12 (92%)	11 (100%)	0	100	100
All	All	1329/2454 (54%)	1326 (100%)	3 (0%)	93	96

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	253	THR
1	C	352	ARG
1	F	404	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	158	GLN
1	B	448	GLN
1	C	220	GLN
1	D	340	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 9 ligands modelled in this entry, 4 are monoatomic - leaving 5 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	$\# Z > 2$
3	ATP	B	501	4	26,33,33	0.91	1 (3%)	31,52,52	1.69	5 (16%)
3	ATP	E	501	4	26,33,33	0.97	1 (3%)	31,52,52	1.83	6 (19%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	ATP	C	501	4	26,33,33	0.92	1 (3%)	31,52,52	1.92	7 (22%)
3	ATP	D	501	4	26,33,33	0.94	1 (3%)	31,52,52	1.82	6 (19%)
3	ATP	F	501	-	26,33,33	0.90	1 (3%)	31,52,52	1.75	6 (19%)

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	ATP	B	501	4	-	7/18/38/38	0/3/3/3
3	ATP	E	501	4	-	0/18/38/38	0/3/3/3
3	ATP	C	501	4	-	5/18/38/38	0/3/3/3
3	ATP	D	501	4	-	0/18/38/38	0/3/3/3
3	ATP	F	501	-	-	0/18/38/38	0/3/3/3

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	501	ATP	C5-C4	2.24	1.46	1.40
3	F	501	ATP	C5-C4	2.24	1.46	1.40
3	D	501	ATP	C5-C4	2.20	1.46	1.40
3	B	501	ATP	C5-C4	2.14	1.46	1.40
3	E	501	ATP	C5-C4	2.13	1.46	1.40

The worst 5 of 30 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	501	ATP	PA-O3A-PB	-5.61	113.58	132.83
3	E	501	ATP	PA-O3A-PB	-5.10	115.32	132.83
3	E	501	ATP	PB-O3B-PG	-4.91	115.98	132.83
3	C	501	ATP	PA-O3A-PB	-4.86	116.14	132.83
3	B	501	ATP	PA-O3A-PB	-4.82	116.30	132.83

There are no chirality outliers.

5 of 12 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	501	ATP	PB-O3B-PG-O3G
3	B	501	ATP	C5'-O5'-PA-O3A

Continued on next page...

Continued from previous page...

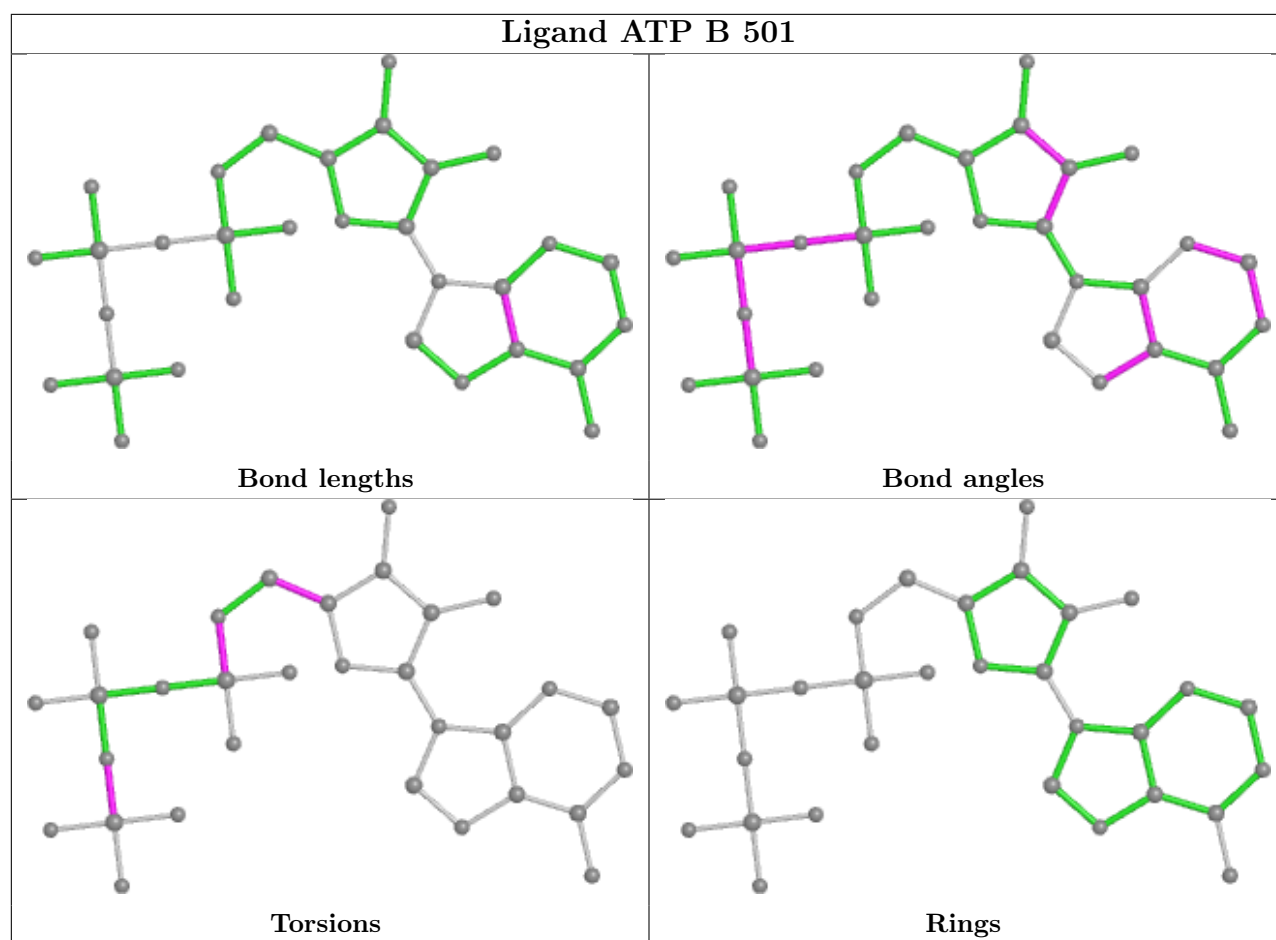
Mol	Chain	Res	Type	Atoms
3	C	501	ATP	C5'-O5'-PA-O2A
3	C	501	ATP	C3'-C4'-C5'-O5'
3	B	501	ATP	O4'-C4'-C5'-O5'

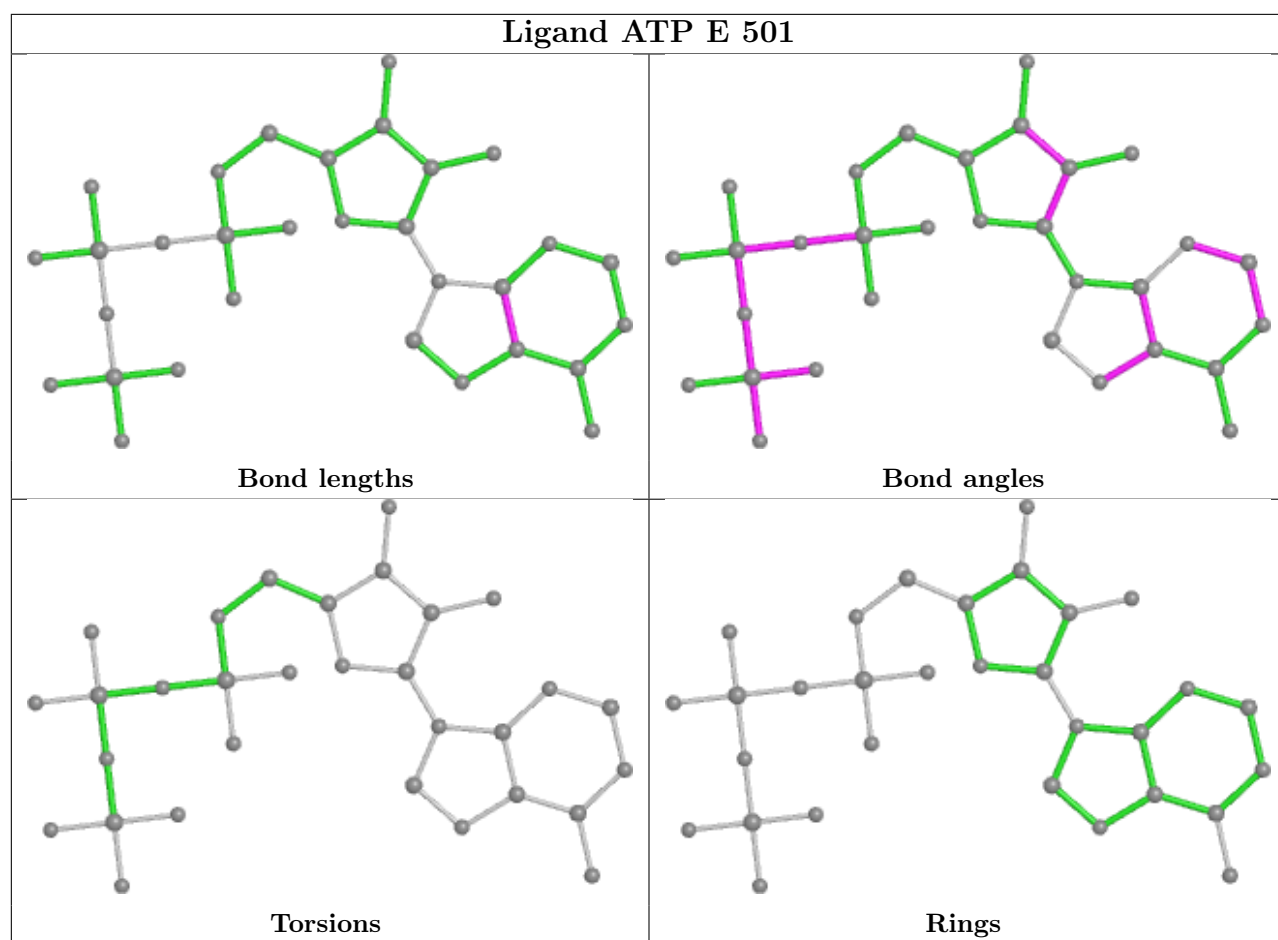
There are no ring outliers.

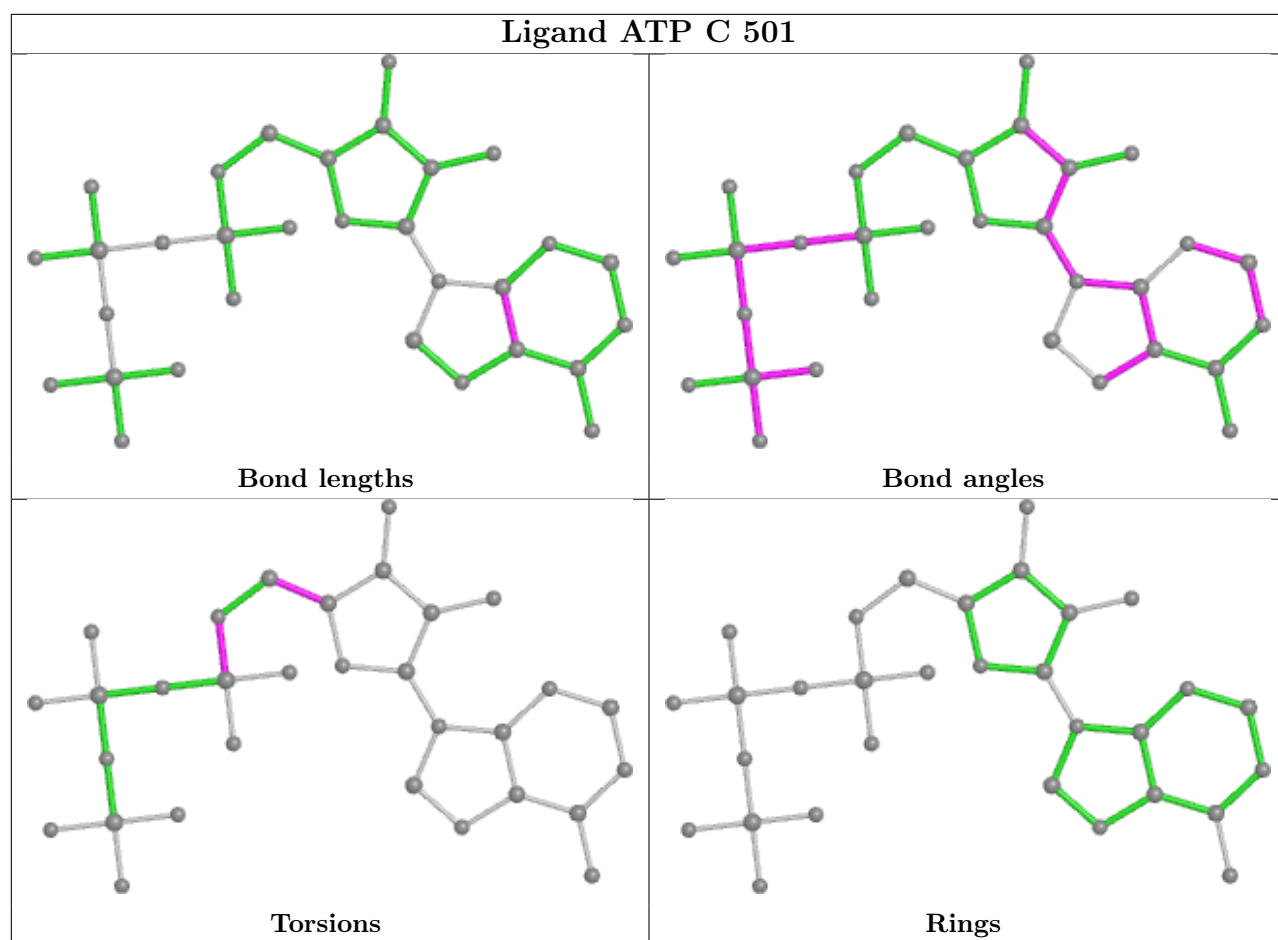
2 monomers are involved in 3 short contacts:

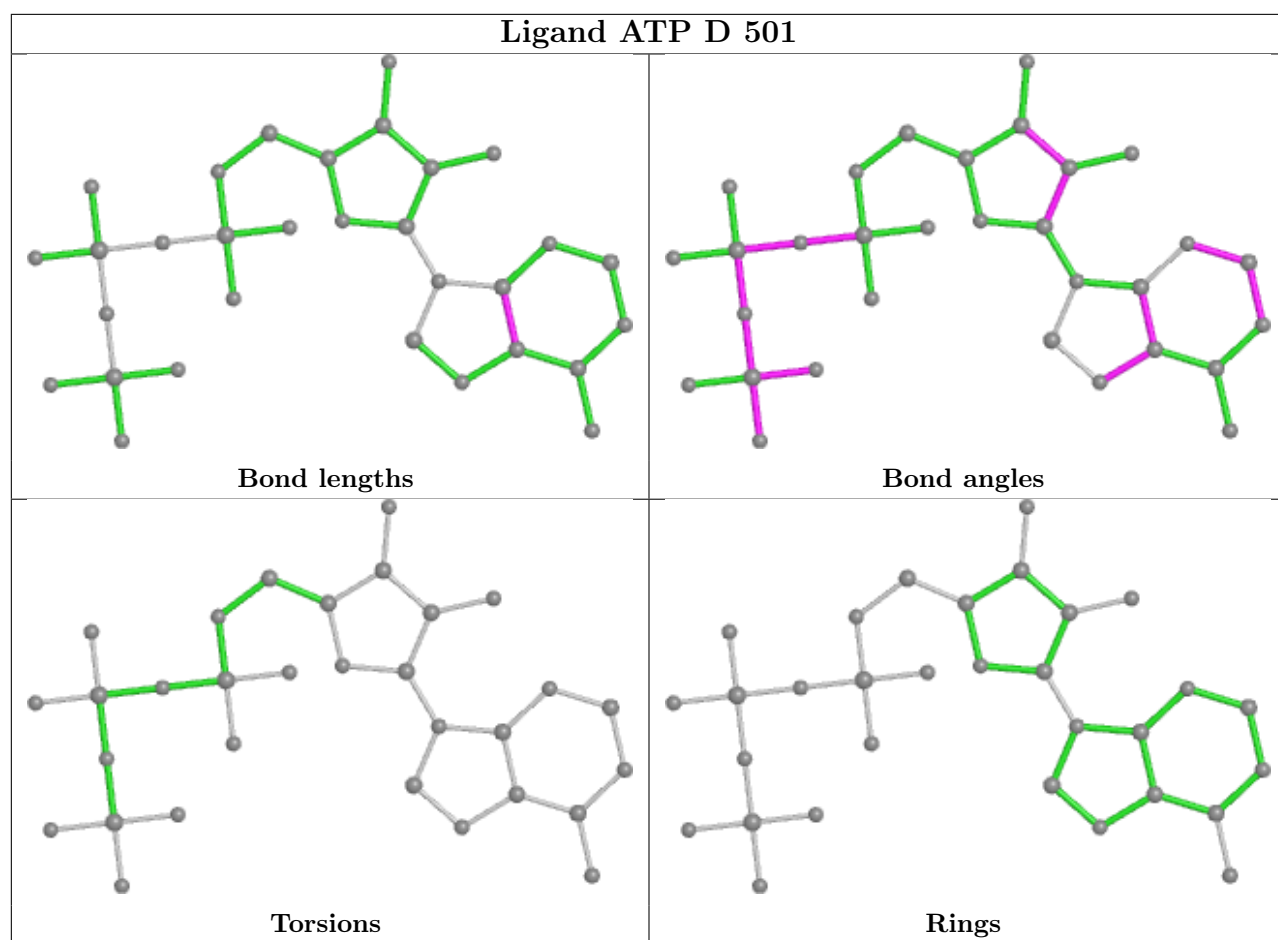
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	501	ATP	1	0
3	E	501	ATP	2	0

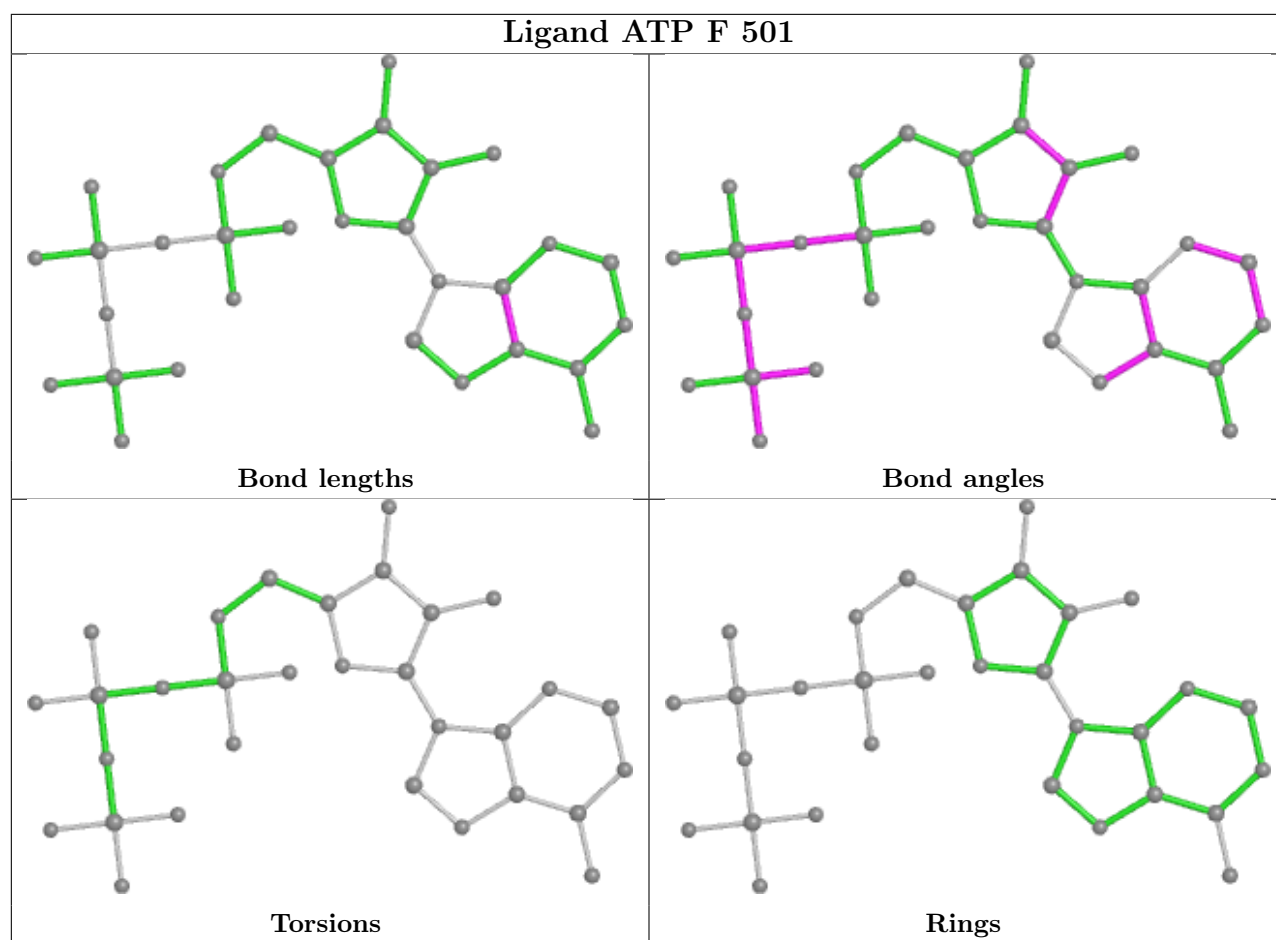
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

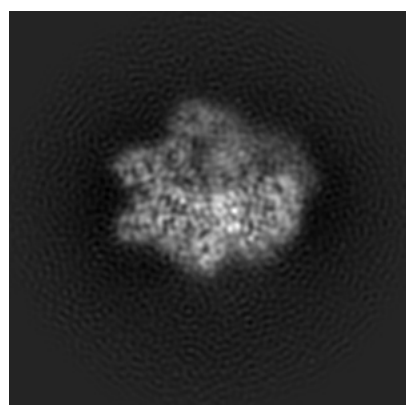
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-20763. These allow visual inspection of the internal detail of the map and identification of artifacts.

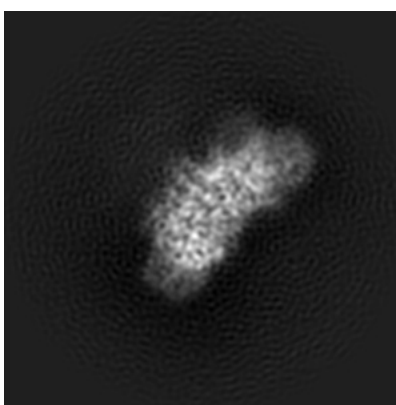
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

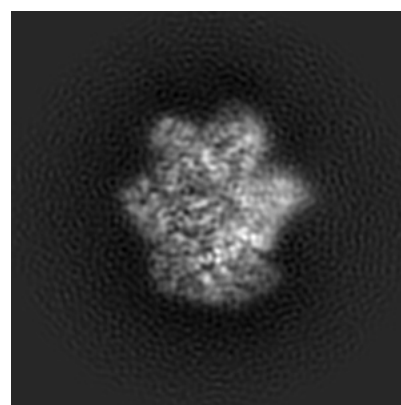
6.1.1 Primary map



X



Y

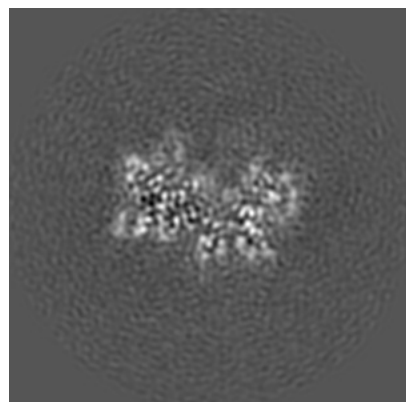


Z

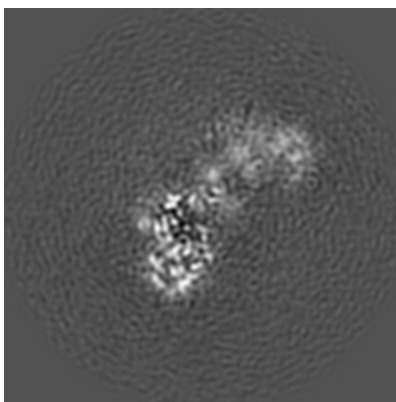
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

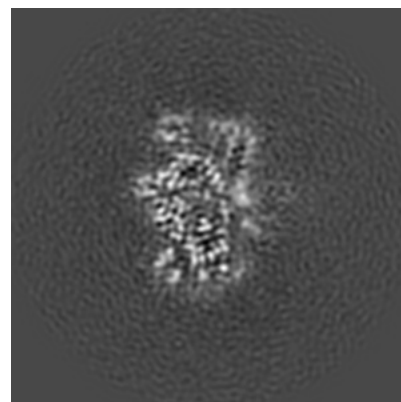
6.2.1 Primary map



X Index: 112



Y Index: 112

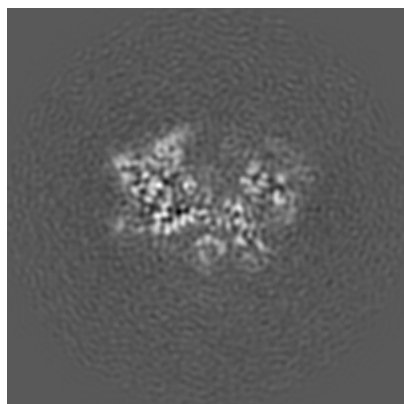


Z Index: 112

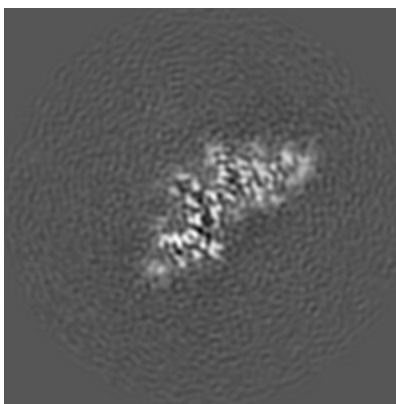
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

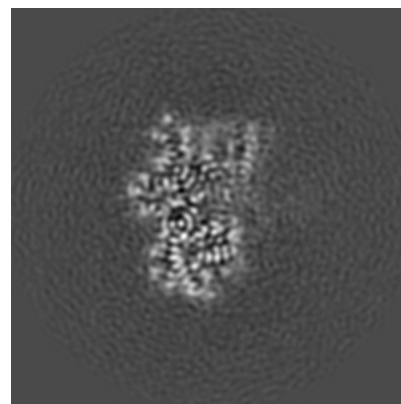
6.3.1 Primary map



X Index: 115



Y Index: 97

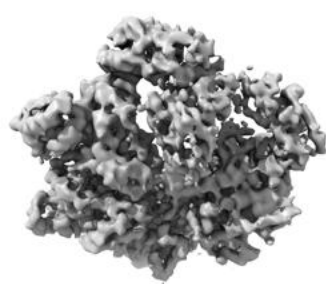


Z Index: 107

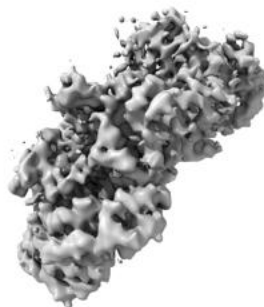
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal surface views [i](#)

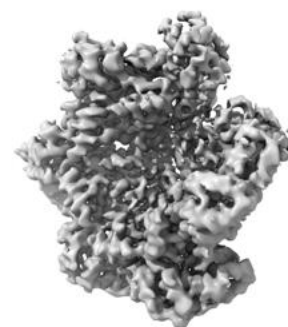
6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 5.22. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

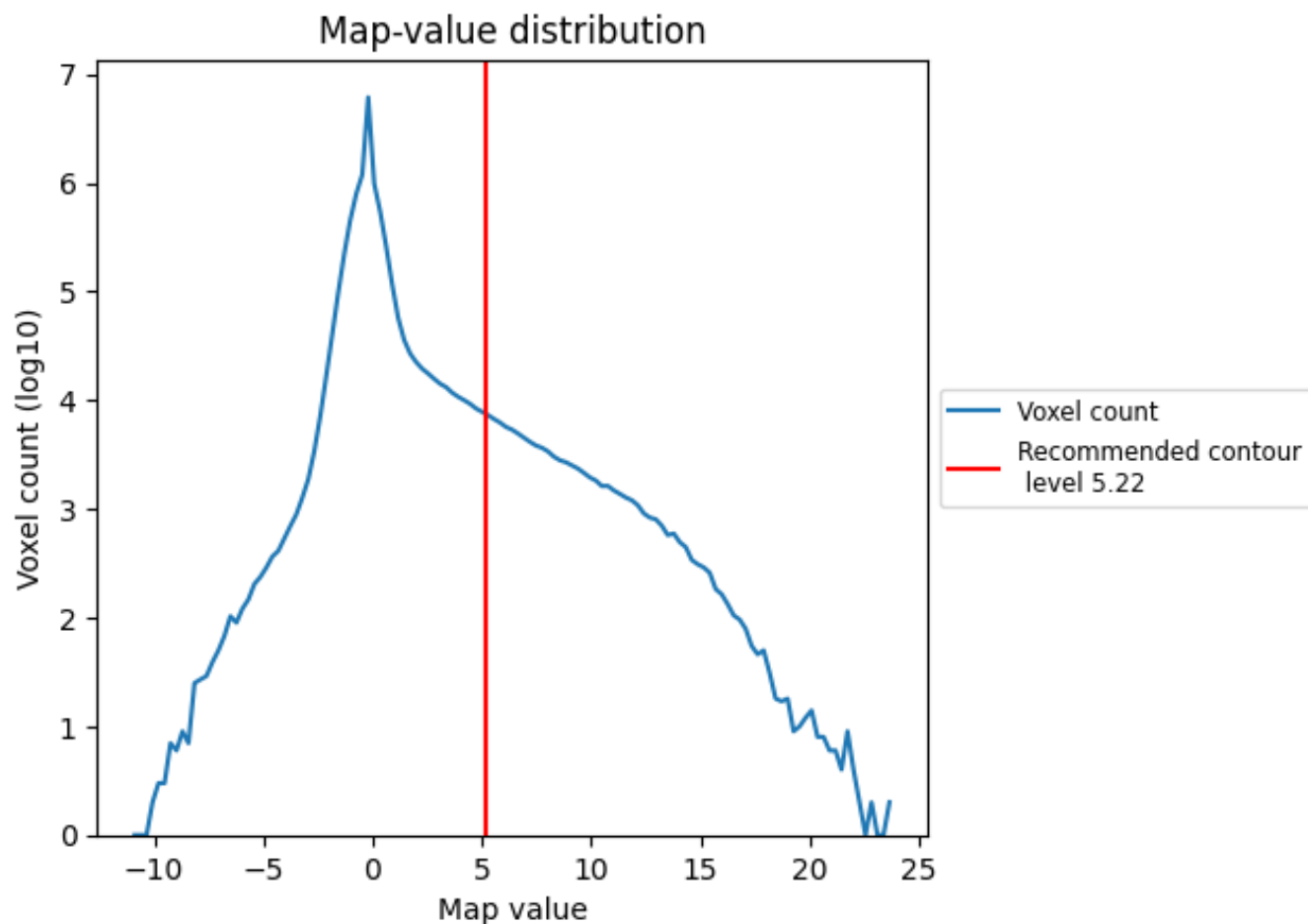
6.5 Mask visualisation

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

7 Map analysis [i](#)

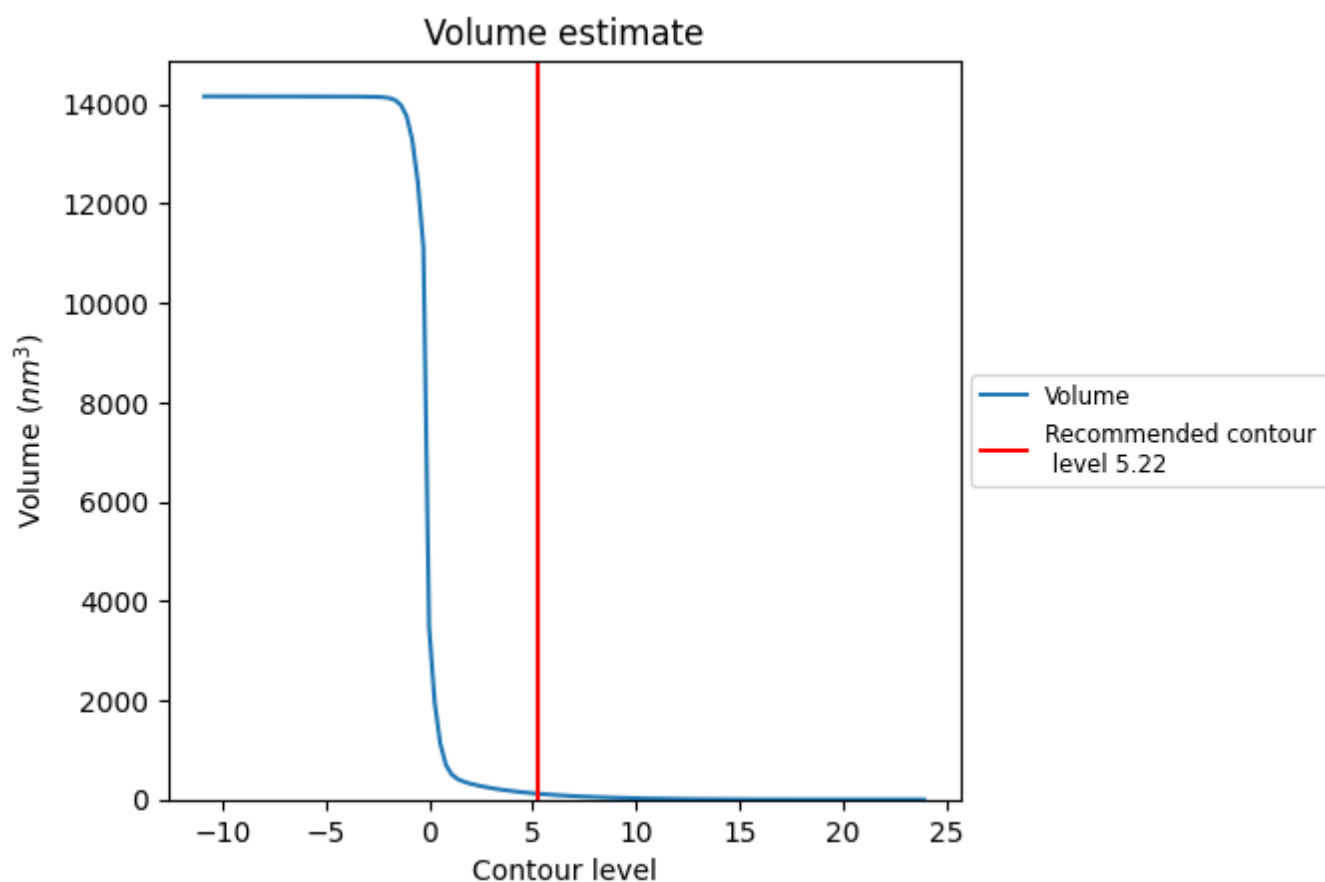
This section contains the results of statistical analysis of the map.

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.

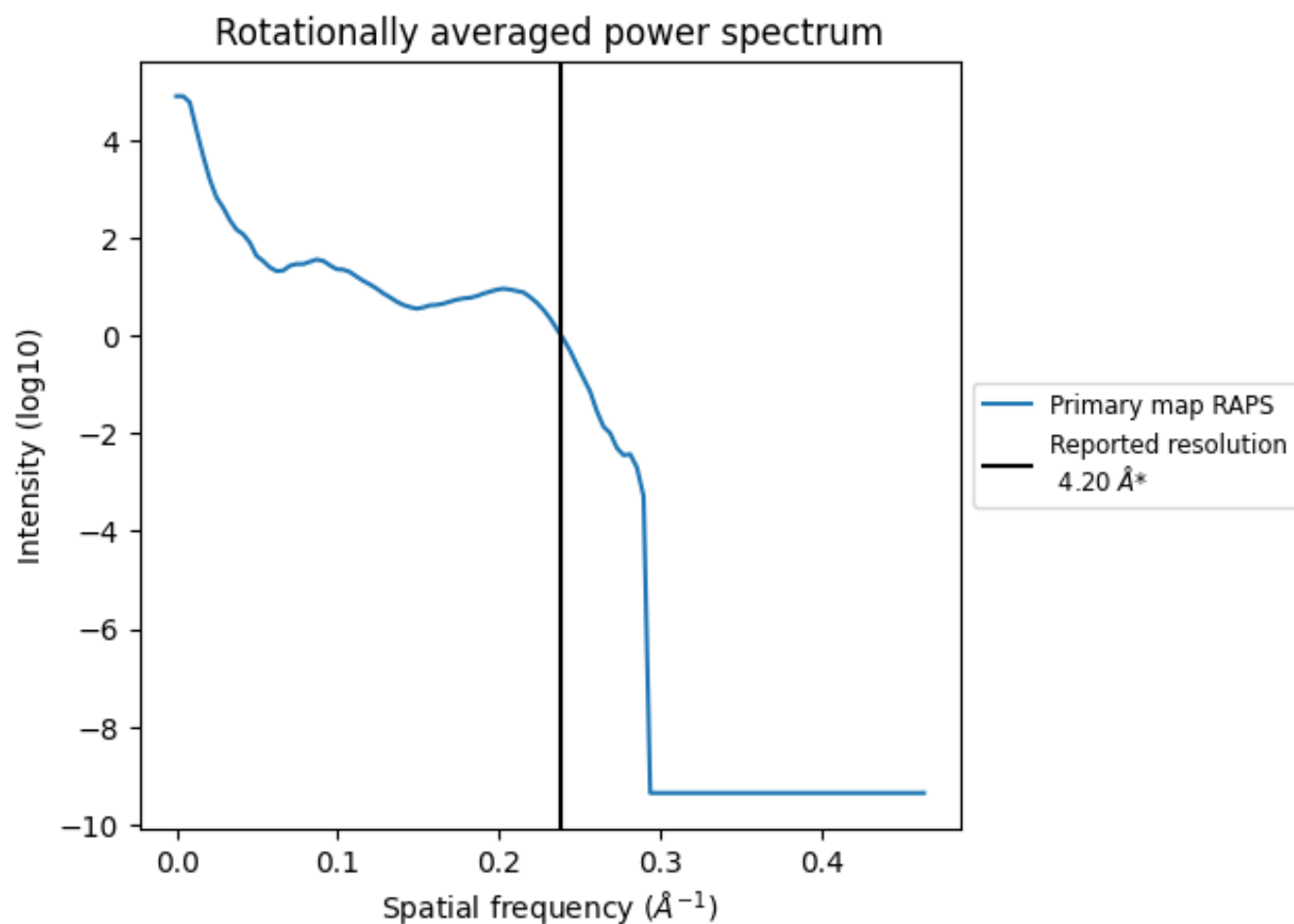
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 119 nm³; this corresponds to an approximate mass of 107 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 ⓘ

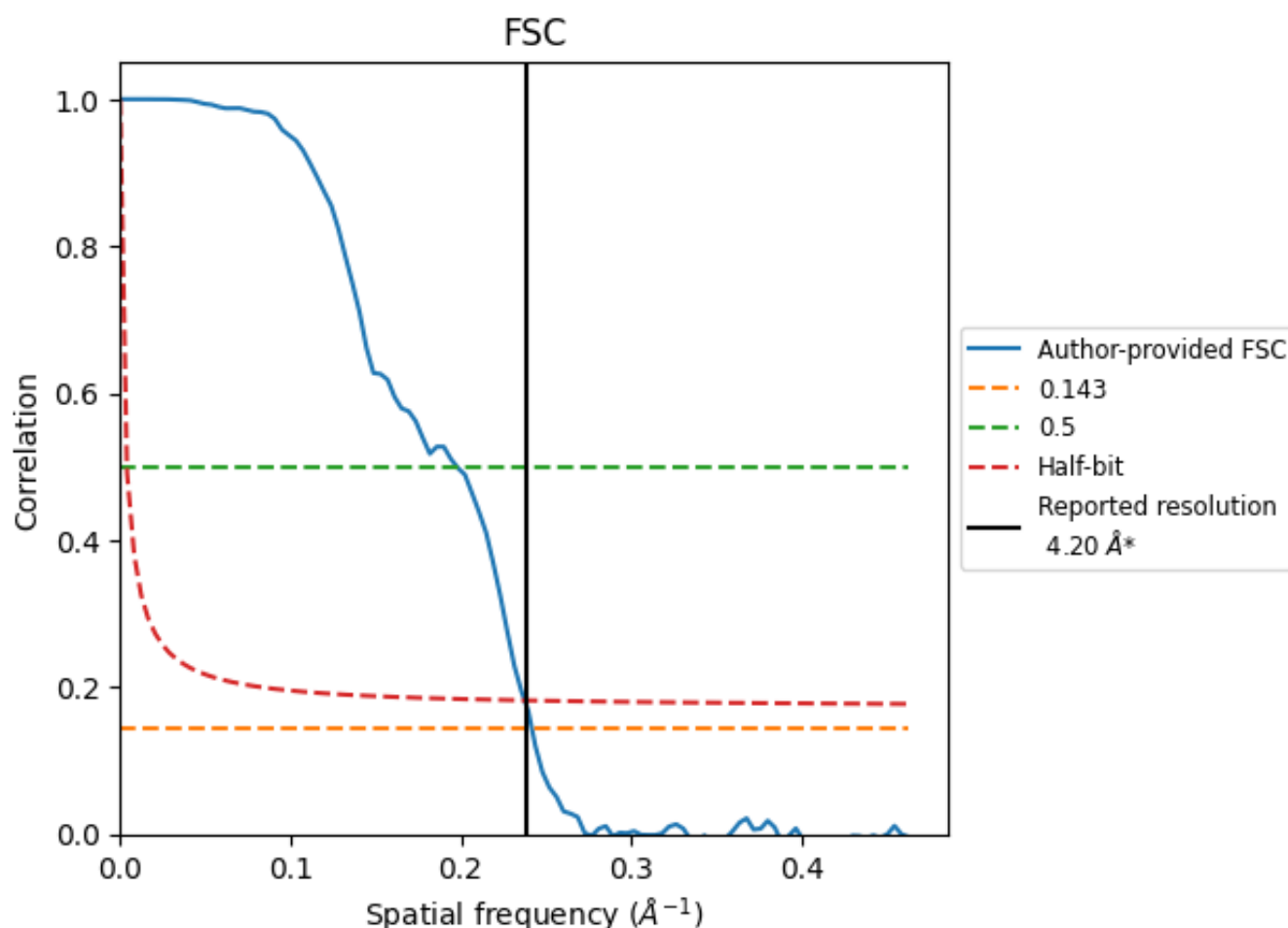


*Reported resolution corresponds to spatial frequency of 0.238 Å⁻¹

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 0.238 Å⁻¹

8.2 Resolution estimates [i](#)

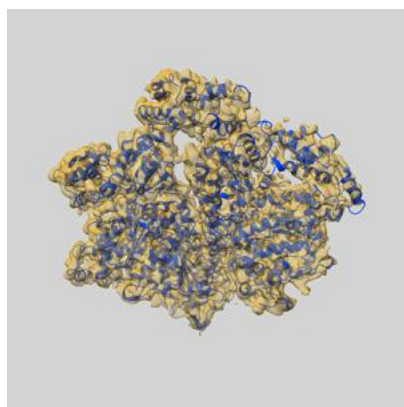
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.20	-	-
Author-provided FSC curve	4.14	5.06	4.21
Unmasked-calculated*	-	-	-

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

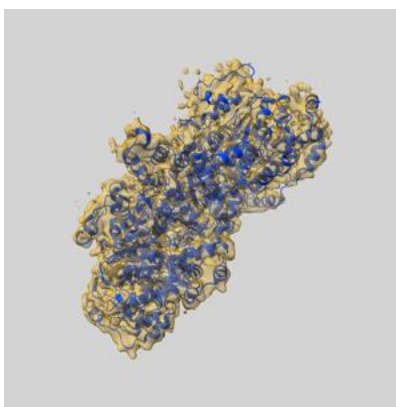
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-20763 and PDB model 6UGF. Per-residue inclusion information can be found in section [3](#) on page [8](#).

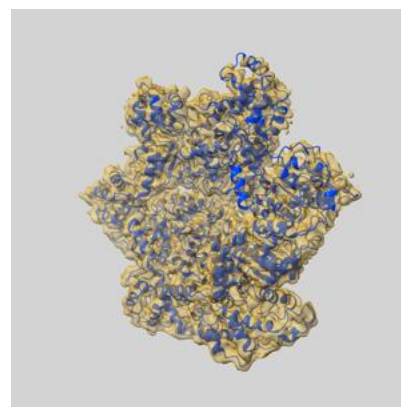
9.1 Map-model overlay [i](#)



X



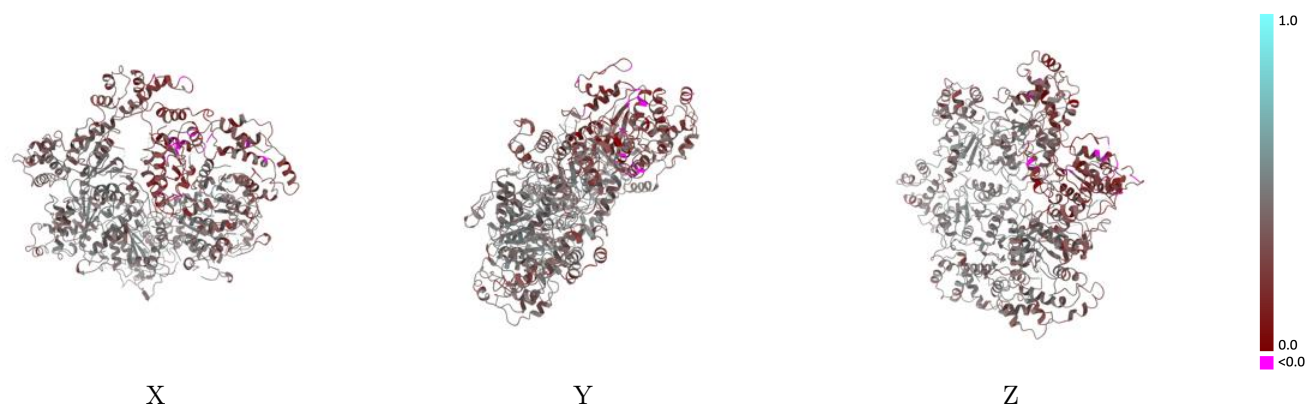
Y



Z

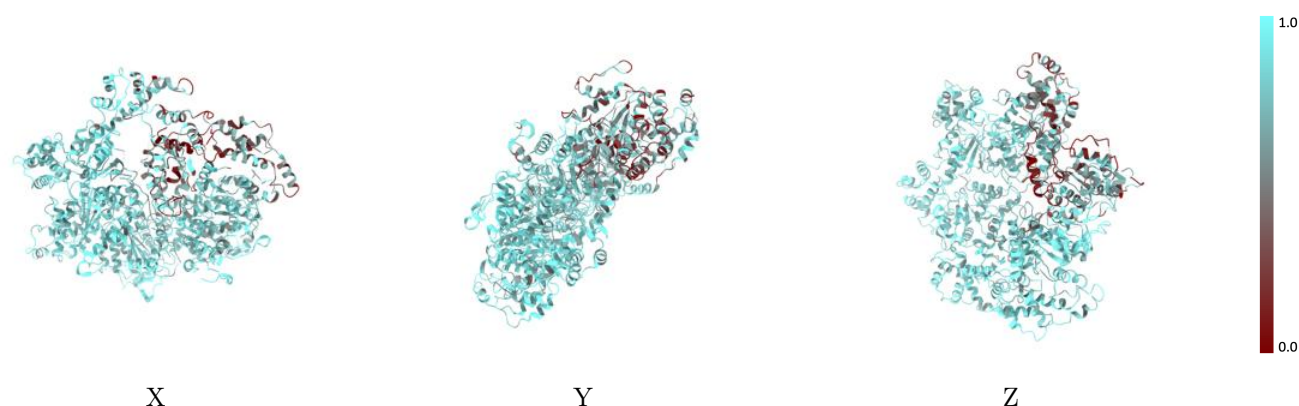
The images above show the 3D surface view of the map at the recommended contour level 5.22 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



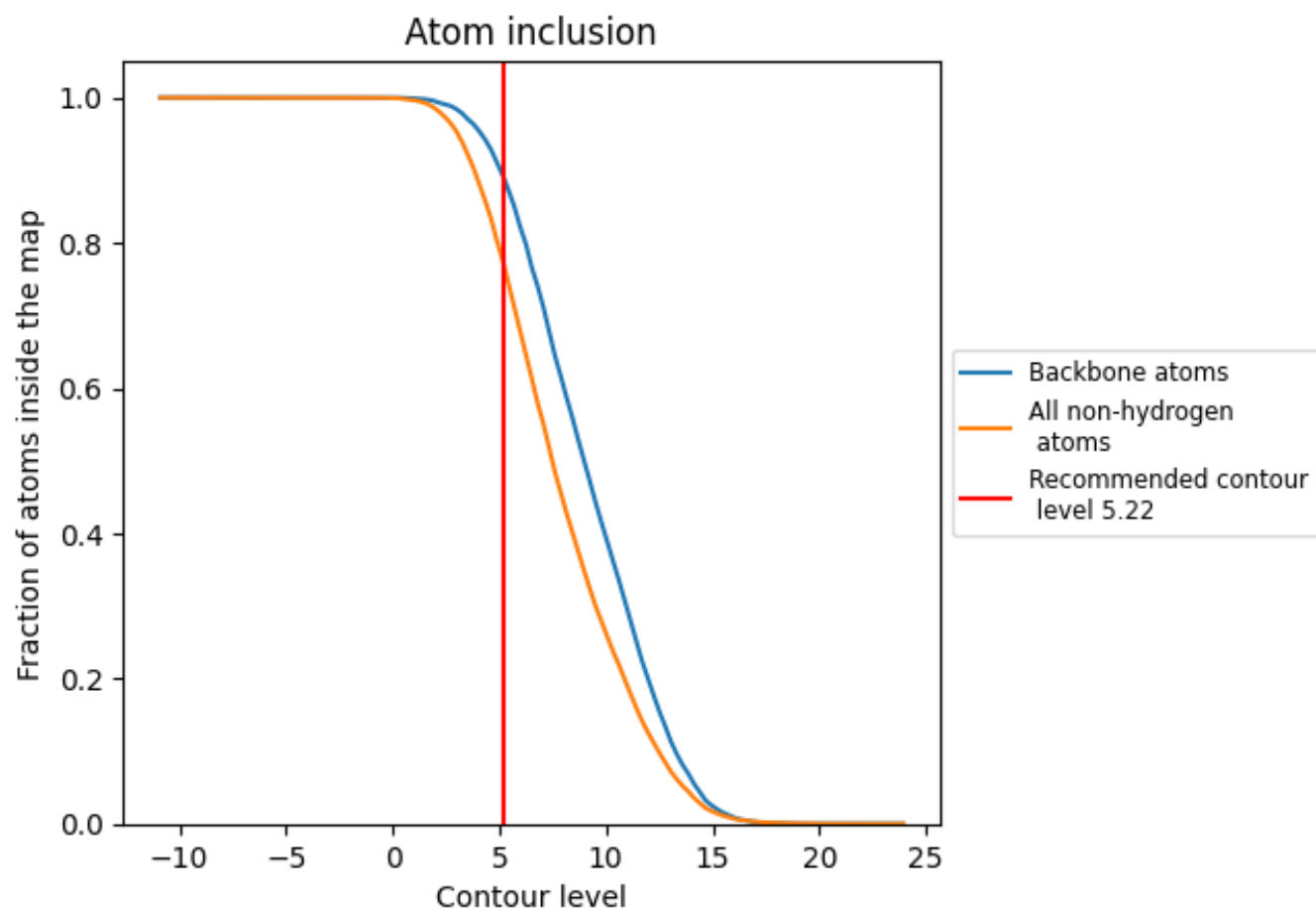
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (5.22).

9.4 Atom inclusion [i](#)



At the recommended contour level, 89% of all backbone atoms, 77% 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 (5.22) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	<div></div> 0.7693	<div></div> 0.3920
A	<div></div> 0.4707	<div></div> 0.2550
B	<div></div> 0.7555	<div></div> 0.3760
C	<div></div> 0.8591	<div></div> 0.4350
D	<div></div> 0.8665	<div></div> 0.4470
E	<div></div> 0.8566	<div></div> 0.4400
F	<div></div> 0.8029	<div></div> 0.3900
G	<div></div> 0.6058	<div></div> 0.4420

1.0

0.0

<0.0