W O R L D W I D E

wwPDB

P R O T E I N   D A T A   B A N K

wwPDB EM Validation Summary Report (i)

Jun 2, 2024 – 03:30 PM EDT

PDB ID	:	8DBR
EMDB ID	:	EMD-27303
Title	:	E. coli ATP synthase imaged in 10mM MgATP State2 "half-up
Authors	:	Sobti, M.; Stewart, A.G.
Deposited on	:	2022-06-14
Resolution	:	3.20 Å(reported)

The following versions of software and data (see references (i)) were used in the production of this report:

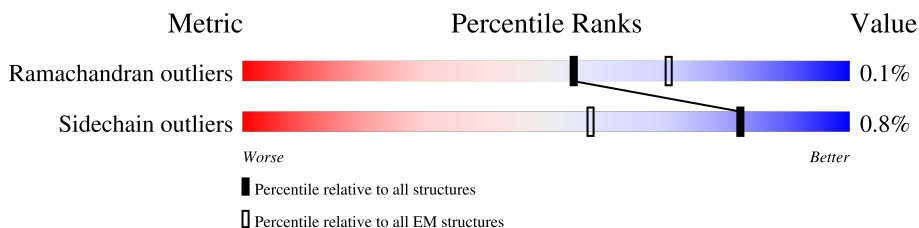|		
EMDB validation analysis	:	0.0.1.dev92
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

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 3.20 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	Percentile Ranks	Value
Ramachandran outliers		0.1%
Sidechain outliers		0.8%

Worse   *Better*

▐ Percentile relative to all structures
▯ Percentile relative to all EM structures

Metric	Whole archive (#Entries)	EM structures (#Entries)
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 <=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	513	98%
1	B	513	100%
1	C	513	99%
2	D	460	99%
2	E	460	99%
2	F	460	99%
3	G	287	98%
4	H	139	73% 27%
5	I	79	15% 97%

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Mol	Chain	Length	Quality of chain
5	J	79	19% / 97%
5	L	79	24% / 97%
5	M	79	16% / 97%
5	N	79	16% / 97%
5	O	79	11% / 97%
5	P	79	13% / 97%
5	Q	79	20% / 97%
5	R	79	10% / 96%
5	S	79	11% / 97%
6	W	177	96%
7	X	156	19% / 99%
7	Y	156	18% / 100%
8	a	271	14% / 96%

2 Entry composition ⓘ

There are 11 unique types of molecules in this entry. The entry contains 36678 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 ATP synthase subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	508	Total 3826	C 2402	N 676	O 739	S 9	0	0
1	B	513	Total 3877	C 2438	N 683	O 746	S 10	0	0
1	C	510	Total 3849	C 2419	N 679	O 742	S 9	0	0

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	47	ALA	CYS	conflict	UNP A0A7U9G3U3
A	90	ALA	CYS	conflict	UNP A0A7U9G3U3
A	193	ALA	CYS	conflict	UNP A0A7U9G3U3
A	243	ALA	CYS	conflict	UNP A0A7U9G3U3
B	47	ALA	CYS	conflict	UNP A0A7U9G3U3
B	90	ALA	CYS	conflict	UNP A0A7U9G3U3
B	193	ALA	CYS	conflict	UNP A0A7U9G3U3
B	243	ALA	CYS	conflict	UNP A0A7U9G3U3
C	47	ALA	CYS	conflict	UNP A0A7U9G3U3
C	90	ALA	CYS	conflict	UNP A0A7U9G3U3
C	193	ALA	CYS	conflict	UNP A0A7U9G3U3
C	243	ALA	CYS	conflict	UNP A0A7U9G3U3

- Molecule 2 is a protein called ATP synthase subunit beta.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	D	458	Total 3520	C 2219	N 602	O 685	S 14	0	0
2	E	460	Total 3533	C 2227	N 604	O 687	S 15	0	0
2	F	460	Total 3533	C 2227	N 604	O 687	S 15	0	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	137	ALA	CYS	conflict	UNP A0A192CEZ8
E	137	ALA	CYS	conflict	UNP A0A192CEZ8
F	137	ALA	CYS	conflict	UNP A0A192CEZ8

- Molecule 3 is a protein called ATP synthase gamma chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	G	284	Total 2186	C 1373	N 382	O 419	S 12	0	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
G	5	ASP	GLU	conflict	UNP C3SLA2
G	87	ALA	CYS	conflict	UNP C3SLA2
G	112	ALA	CYS	conflict	UNP C3SLA2

- Molecule 4 is a protein called ATP synthase epsilon chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	H	101	Total 772	C 486	N 133	O 150	S 3	0	0

- Molecule 5 is a protein called ATP synthase subunit c.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	I	77	Total 557	C 370	N 88	O 92	S 7	0	0
5	J	77	Total 557	C 370	N 88	O 92	S 7	0	0
5	L	77	Total 557	C 370	N 88	O 92	S 7	0	0
5	M	77	Total 557	C 370	N 88	O 92	S 7	0	0
5	N	77	Total 557	C 370	N 88	O 92	S 7	0	0
5	O	77	Total 557	C 370	N 88	O 92	S 7	0	0
5	P	77	Total 557	C 370	N 88	O 92	S 7	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
5	Q	77	Total	C	N	O	S	0	0
			557	370	88	92	7		
5	R	76	Total	C	N	O	S	0	0
			552	367	87	91	7		
5	S	77	Total	C	N	O	S	0	0
			557	370	88	92	7		

- Molecule 6 is a protein called ATP synthase subunit delta.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	W	173	Total	C	N	O	S	0	0
			1320	827	233	254	6		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
W	64	ALA	CYS	conflict	UNP V0ZA15
W	140	ALA	CYS	conflict	UNP V0ZA15

- Molecule 7 is a protein called ATP synthase subunit b.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	X	156	Total	C	N	O	S	0	0
			1200	751	214	232	3		
7	Y	156	Total	C	N	O	S	0	0
			1210	757	218	232	3		

- Molecule 8 is a protein called ATP synthase subunit a.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	a	266	Total	C	N	O	S	0	0
			2104	1419	326	349	10		

- Molecule 9 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).
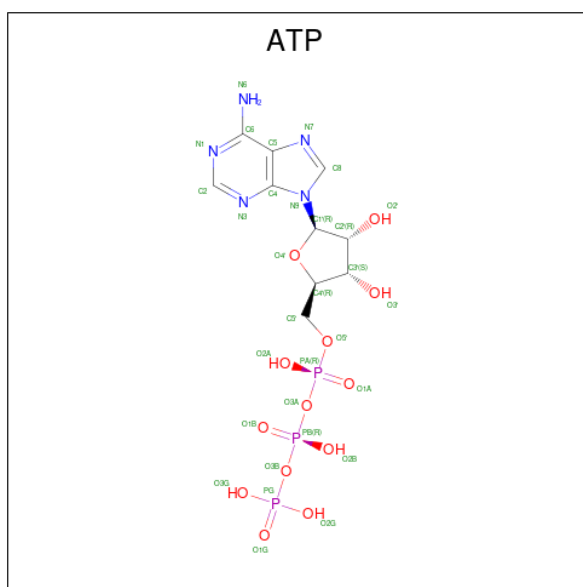
ATP

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

- Molecule 10 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

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

- Molecule 11 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).

ADP

Mol	Chain	Residues	Atoms					AltConf
11	E	1	Total	C	N	O	P	0
			27	10	5	10	2	
11	F	1	Total	C	N	O	P	0
			27	10	5	10	2	

3   Residue-property plots ⓘ

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

- Molecule 1: ATP synthase subunit alpha

Chain A: 98%
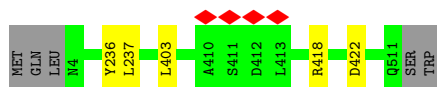
- Molecule 1: ATP synthase subunit alpha

Chain B: 100%
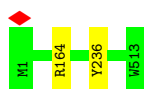
- Molecule 1: ATP synthase subunit alpha

Chain C: 99%

- Molecule 2: ATP synthase subunit beta

Chain D: 99%

- Molecule 2: ATP synthase subunit beta

Chain E: 99%

- Molecule 2: ATP synthase subunit beta

Chain F:

99%

MO | R164 | M261 | V265 | S401 | K458 | L459

• Molecule 3: ATP synthase gamma chain

Chain G:

98%

MET | A1 | G2 | A3 | R42 | N59 | D69 | K73 | I149 | M178 | D194 | K258 | A284 | ALA | VAL
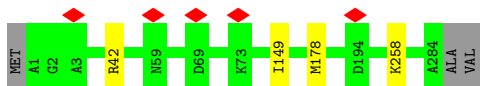
• Molecule 4: ATP synthase epsilon chain

Chain H:

73%　　　　　　　　　　　27%
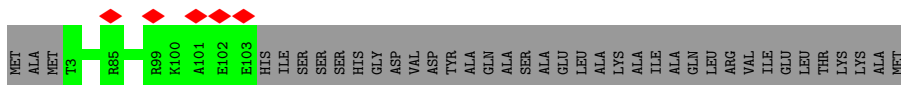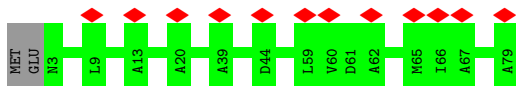
MET | ALA | MET | T3 | R85 | R99 | K100 | A101 | E102 | E103 | HIS | ILE | SER | SER | HIS | GLY | ASP | VAL | ASP | TYR | ALA | GLN | ALA | SER | ALA | GLU | LEU | ALA | LYS | ALA | ILE | ALA | GLN | LEU | ARG | VAL | ILE | GLU | LEU | THR | LYS | LYS | ALA | MET

• Molecule 5: ATP synthase subunit c

Chain I:

15%

97%

MET | GLU | N3 | L9 | A13 | A20 | A39 | D44 | L59 | V60 | D61 | A62 | M65 | I66 | A67 | A79

• Molecule 5: ATP synthase subunit c

Chain J:

19%

97%

MET | GLU | N3 | A14 | A20 | A24 | A25 | I28 | L36 | A39 | D44 | F54 | G58 | L59 | M65 | I66 | L70 | A79

• Molecule 5: ATP synthase subunit c

Chain L:

24%

97%

MET | GLU | N3 | A12 | L19 | A20 | A21 | I22 | G23 | A24 | A25 | I26 | G27 | G38 | D44 | I55 | G58 | D61 | A62 | I63 | P64 | M65 | I66 | A67 | A79

• Molecule 5: ATP synthase subunit c

Chain M:

16%

97%

MET | GLU | N3 | A24 | A25 | I28 | G32 | F54 | G58 | L59 | V60 | D61 | M65 | I66 | A67 | L72 | A77 | V78 | A79

• Molecule 5: ATP synthase subunit c

16%

Chain N:
97%

• Molecule 5: ATP synthase subunit c

11%

Chain O:
97%

• Molecule 5: ATP synthase subunit c

13%

Chain P:
97%

• Molecule 5: ATP synthase subunit c

20%

Chain Q:
97%

• Molecule 5: ATP synthase subunit c

10%

Chain R:
96%

• Molecule 5: ATP synthase subunit c

11%
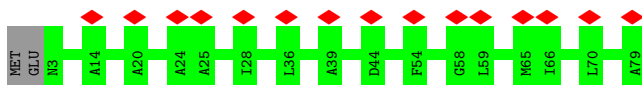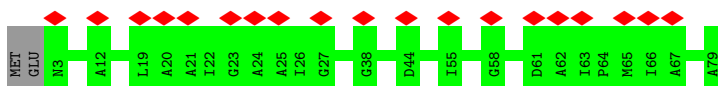
Chain S:
97%
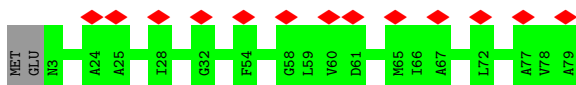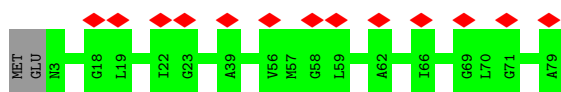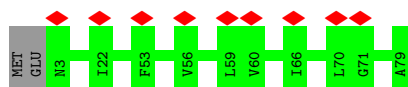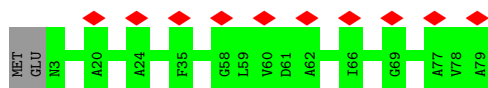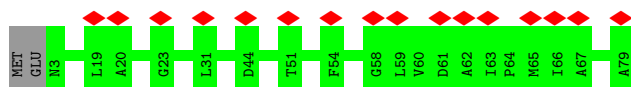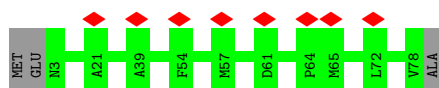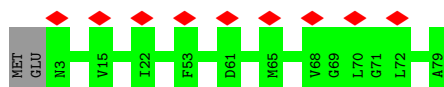
• Molecule 6: ATP synthase subunit delta

Chain W:
96%

MET SER. E2 Q67 L68 K137 K144 L174 GLN SER

• Molecule 7: ATP synthase subunit b

19%

Chain X: 99%

M1 L8 G9 Q10 A11 I12 A13 F14 V15 L16 M30 A31 A32 I33 E34 K35 R36 Q37 K38 E39 I40 A41 D42 G43 L44 A45 S46 A47 E48 R49 A50 H51 K52 D53 A57 E137 R138 S139 V140 D141 E142 A143 D147 K151 E155 L156

• Molecule 7: ATP synthase subunit b

18%

Chain Y: 100%

M1 A13 Y24 V25 K35 R36 Q37 K38 E39 I40 A41 D42 G43 L44 A45 S46 A47 E48 R49 A50 H51 K52 D53 L54 D55 L56 A57 K58 A59 S60 A61 T62 K66 A70 L156
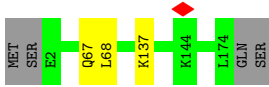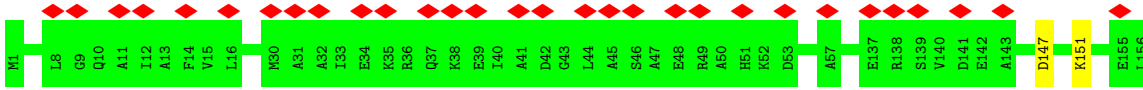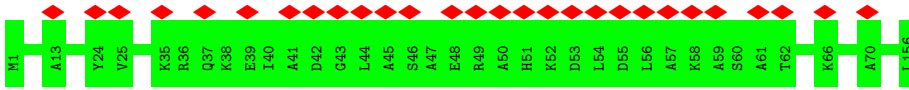
• Molecule 8: ATP synthase subunit a

14%

Chain a: 96%

MET ALA SER E4 N5 N18 L19 Q20 L21 D30 N33 A36 F47 V50 L54 A64 K65 K66 A67 T68 S69 G70 V71 P72 G73 A78 I79 V82 V86 K97 N116 L126 A130 P143 S152 I159 H185 I189 P190

A217 Q234 N238 V239 F244 I249 F256 L264 A267 S268 E269 GLU HIS
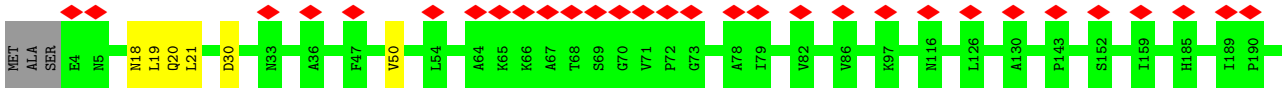
4   Experimental information   ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	74946	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 $(e^-/\text{Å}^2)$	48	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	1500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.072	Depositor
Minimum map value	-0.020	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.01	Depositor
Map size (Å)	379.80798, 379.80798, 379.80798	wwPDB
Map dimensions	352, 352, 352	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.079, 1.079, 1.079	Depositor

5   Model quality ⓘ

5.1   Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: ATP, ADP, MG

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	0.50	0/3879	0.62	0/5248
1	B	0.51	0/3933	0.62	0/5321
1	C	0.49	0/3903	0.61	0/5280
2	D	0.56	0/3577	0.62	0/4841
2	E	0.47	0/3590	0.60	0/4858
2	F	0.53	0/3590	0.61	0/4858
3	G	0.42	0/2217	0.63	0/2990
4	H	0.35	0/784	0.63	0/1058
5	I	0.47	0/565	0.75	0/764
5	J	0.39	0/565	0.69	0/764
5	L	0.45	0/565	0.82	0/764
5	M	0.41	0/565	0.80	0/764
5	N	0.39	0/565	0.72	0/764
5	O	0.51	0/565	0.84	0/764
5	P	0.46	0/565	0.78	0/764
5	Q	0.50	0/565	0.81	0/764
5	R	0.37	0/560	0.77	0/757
5	S	0.37	0/565	0.74	0/764
6	W	0.39	0/1333	0.59	0/1798
7	X	0.38	0/1208	0.62	0/1623
7	Y	0.40	0/1218	0.63	0/1634
8	a	0.47	1/2164 (0.0%)	0.71	0/2955
All	All	0.48	1/37041 (0.0%)	0.65	0/50097

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	a	50	VAL	C-N	5.89	1.47	1.34

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2   Too-close contacts ⓘ

Due to software issues we are unable to calculate clashes - this section is therefore empty.

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	506/513 (99%)	491 (97%)	15 (3%)	0	100	100
1	B	511/513 (100%)	501 (98%)	10 (2%)	0	100	100
1	C	508/513 (99%)	496 (98%)	12 (2%)	0	100	100
2	D	456/460 (99%)	441 (97%)	14 (3%)	1 (0%)	47	79
2	E	458/460 (100%)	439 (96%)	18 (4%)	1 (0%)	47	79
2	F	458/460 (100%)	441 (96%)	16 (4%)	1 (0%)	47	79
3	G	282/287 (98%)	277 (98%)	5 (2%)	0	100	100
4	H	99/139 (71%)	98 (99%)	1 (1%)	0	100	100
5	I	75/79 (95%)	72 (96%)	3 (4%)	0	100	100
5	J	75/79 (95%)	73 (97%)	2 (3%)	0	100	100
5	L	75/79 (95%)	75 (100%)	0	0	100	100
5	M	75/79 (95%)	75 (100%)	0	0	100	100
5	N	75/79 (95%)	74 (99%)	1 (1%)	0	100	100
5	O	75/79 (95%)	73 (97%)	2 (3%)	0	100	100
5	P	75/79 (95%)	74 (99%)	1 (1%)	0	100	100
5	Q	75/79 (95%)	74 (99%)	1 (1%)	0	100	100
5	R	74/79 (94%)	72 (97%)	2 (3%)	0	100	100
5	S	75/79 (95%)	75 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
6	W	171/177 (97%)	170 (99%)	1 (1%)	0	100	100
7	X	154/156 (99%)	147 (96%)	7 (4%)	0	100	100
7	Y	154/156 (99%)	152 (99%)	2 (1%)	0	100	100
8	a	264/271 (97%)	249 (94%)	15 (6%)	0	100	100
All	All	4770/4895 (97%)	4639 (97%)	128 (3%)	3 (0%)	54	83

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	F	265	VAL
2	D	265	VAL
2	E	265	VAL

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	397/403 (98%)	392 (99%)	5 (1%)	69	87
1	B	403/403 (100%)	401 (100%)	2 (0%)	88	95
1	C	400/403 (99%)	397 (99%)	3 (1%)	81	93
2	D	379/380 (100%)	379 (100%)	0	100	100
2	E	380/380 (100%)	376 (99%)	4 (1%)	73	88
2	F	380/380 (100%)	376 (99%)	4 (1%)	73	88
3	G	236/238 (99%)	232 (98%)	4 (2%)	60	83
4	H	81/110 (74%)	81 (100%)	0	100	100
5	I	54/56 (96%)	54 (100%)	0	100	100
5	J	54/56 (96%)	54 (100%)	0	100	100
5	L	54/56 (96%)	54 (100%)	0	100	100
5	M	54/56 (96%)	54 (100%)	0	100	100
5	N	54/56 (96%)	54 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
5	O	54/56 (96%)	54 (100%)	0	100	100
5	P	54/56 (96%)	54 (100%)	0	100	100
5	Q	54/56 (96%)	54 (100%)	0	100	100
5	R	54/56 (96%)	54 (100%)	0	100	100
5	S	54/56 (96%)	54 (100%)	0	100	100
6	W	136/140 (97%)	133 (98%)	3 (2%)	52	79
7	X	119/122 (98%)	117 (98%)	2 (2%)	60	83
7	Y	121/122 (99%)	121 (100%)	0	100	100
8	a	233/237 (98%)	228 (98%)	5 (2%)	53	79
All	All	3805/3878 (98%)	3773 (99%)	32 (1%)	82	93

5 of 32 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
8	a	19	LEU
8	a	20	GLN
2	E	103	GLU
2	E	14	ASP
8	a	21	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 24 such sidechains are listed below:

Mol	Chain	Res	Type
5	O	3	ASN
6	W	73	GLN
5	S	52	GLN
7	X	37	GLN
2	D	35	ASN

5.3.3　RNA ⓘ

There are no RNA molecules in this entry.

5.4　Non-standard residues in protein, DNA, RNA chains ⓘ

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 11 ligands modelled in this entry, 5 are monoatomic - leaving 6 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#$|Z| > 2$	Counts	RMSZ	#$|Z| > 2$
9	ATP	C	600	10	26,33,33	0.90	0	31,52,52	1.49	5 (16%)
9	ATP	D	502	10	26,33,33	1.14	2 (7%)	31,52,52	1.67	4 (12%)
11	ADP	F	500	-	24,29,29	0.95	1 (4%)	29,45,45	1.46	3 (10%)
11	ADP	E	501	10	24,29,29	0.97	0	29,45,45	1.28	3 (10%)
9	ATP	A	600	10	26,33,33	0.96	1 (3%)	31,52,52	1.46	4 (12%)
9	ATP	B	600	10	26,33,33	0.89	0	31,52,52	1.40	4 (12%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
9	ATP	C	600	10	-	0/18/38/38	0/3/3/3
9	ATP	D	502	10	-	1/18/38/38	0/3/3/3
11	ADP	F	500	-	-	0/12/32/32	0/3/3/3
11	ADP	E	501	10	-	1/12/32/32	0/3/3/3
9	ATP	A	600	10	-	0/18/38/38	0/3/3/3
9	ATP	B	600	10	-	1/18/38/38	0/3/3/3

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	D	502	ATP	C2'-C1'	-3.55	1.48	1.53
11	F	500	ADP	C5-C4	2.36	1.47	1.40

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WORLDWIDE
wwPDB
PROTEIN DATA BANK

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	D	502	ATP	C5-C4	2.19	1.46	1.40
9	A	600	ATP	C2'-C1'	-2.09	1.50	1.53

The worst 5 of 23 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
9	D	502	ATP	PB-O3B-PG	-5.50	113.95	132.83
9	C	600	ATP	PB-O3B-PG	-4.60	117.03	132.83
9	A	600	ATP	PB-O3B-PG	-3.98	119.18	132.83
9	D	502	ATP	PA-O3A-PB	-3.90	119.43	132.83
9	B	600	ATP	PB-O3B-PG	-3.58	120.53	132.83

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
11	E	501	ADP	PB-O3A-PA-O2A
9	D	502	ATP	O4'-C4'-C5'-O5'
9	B	600	ATP	PA-O3A-PB-O2B

There are no ring outliers.

No monomer is involved in short contacts.

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 then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand ATP C 600

Bond lengths

Bond angles

Torsions

Rings

Ligand ATP D 502

Bond lengths

Bond angles

Torsions

Rings

Ligand ADP F 500

Bond lengths

Bond angles

Torsions

Rings

Ligand ADP E 501

Bond lengths

Bond angles

Torsions

Rings

Ligand ATP A 600

Bond lengths

Bond angles

Torsions

Rings

Ligand ATP B 600

Bond lengths

Bond angles

Torsions

Rings
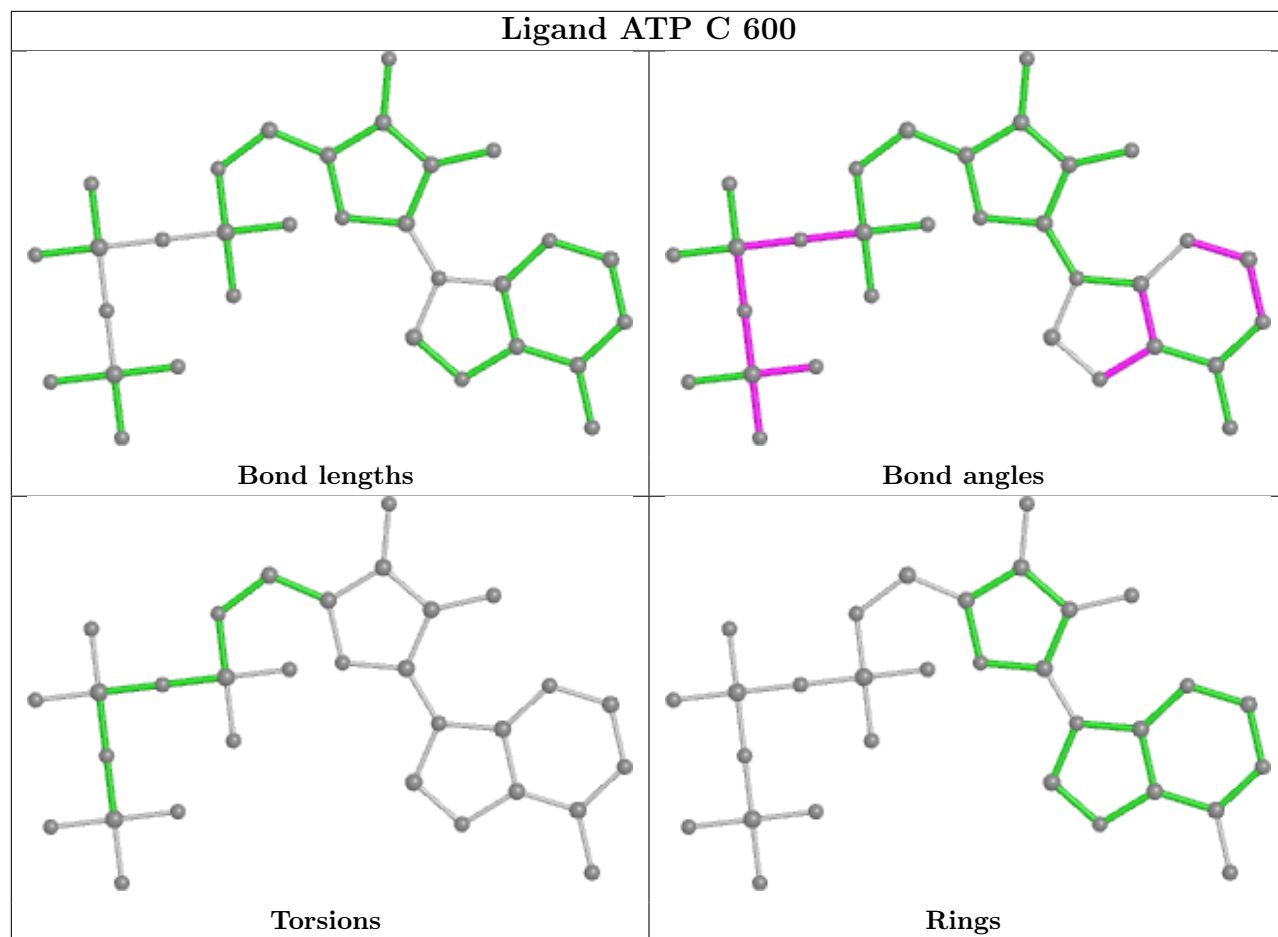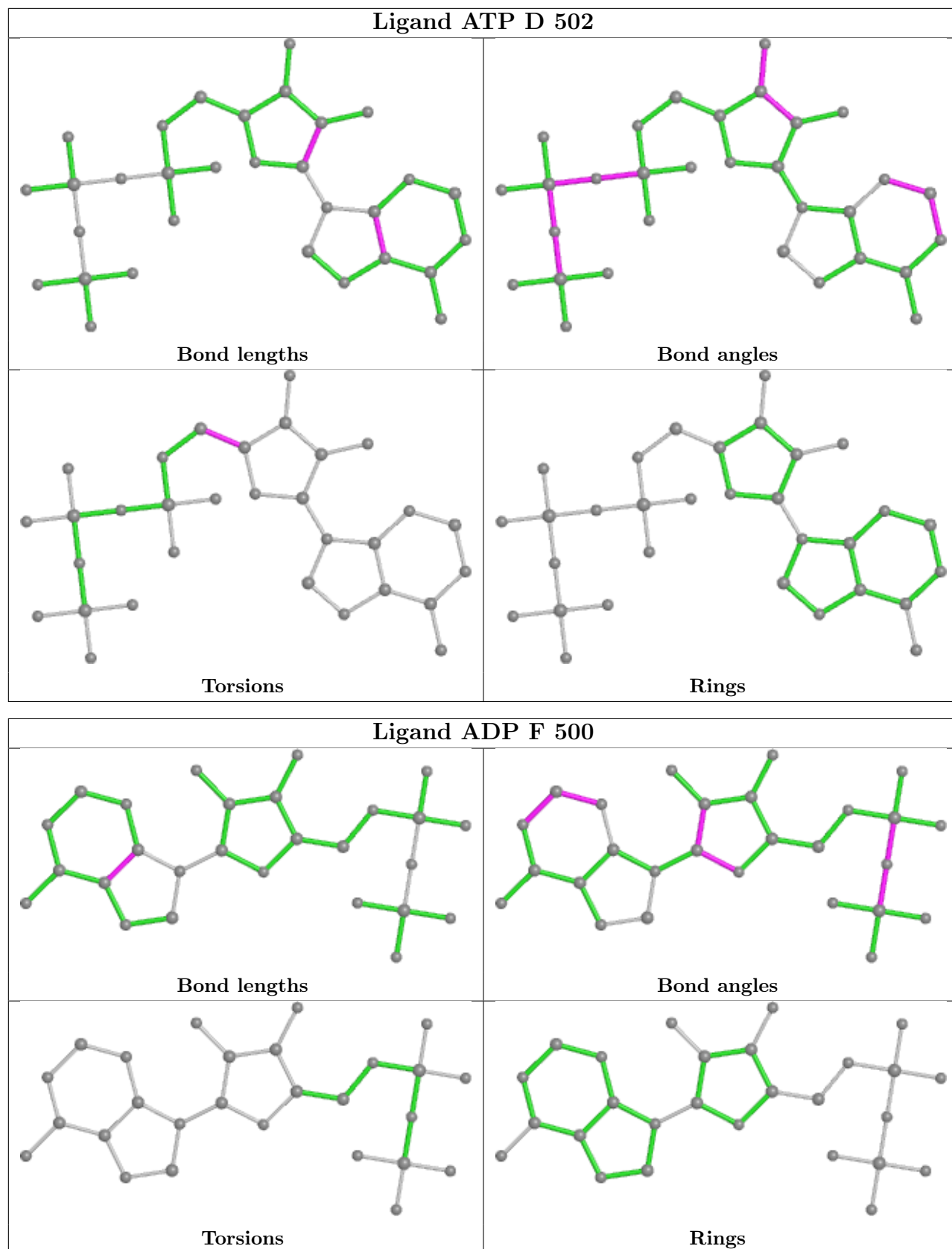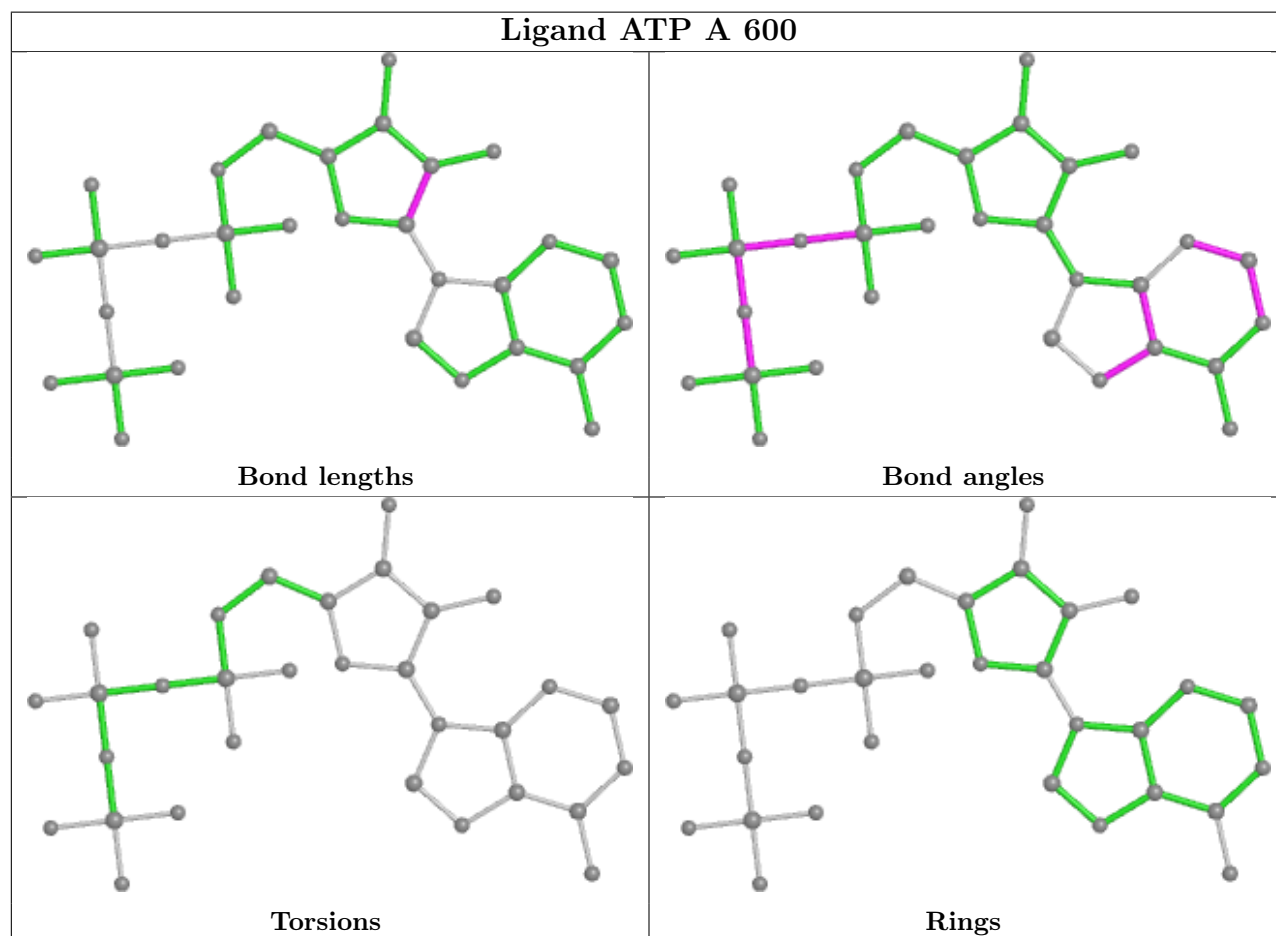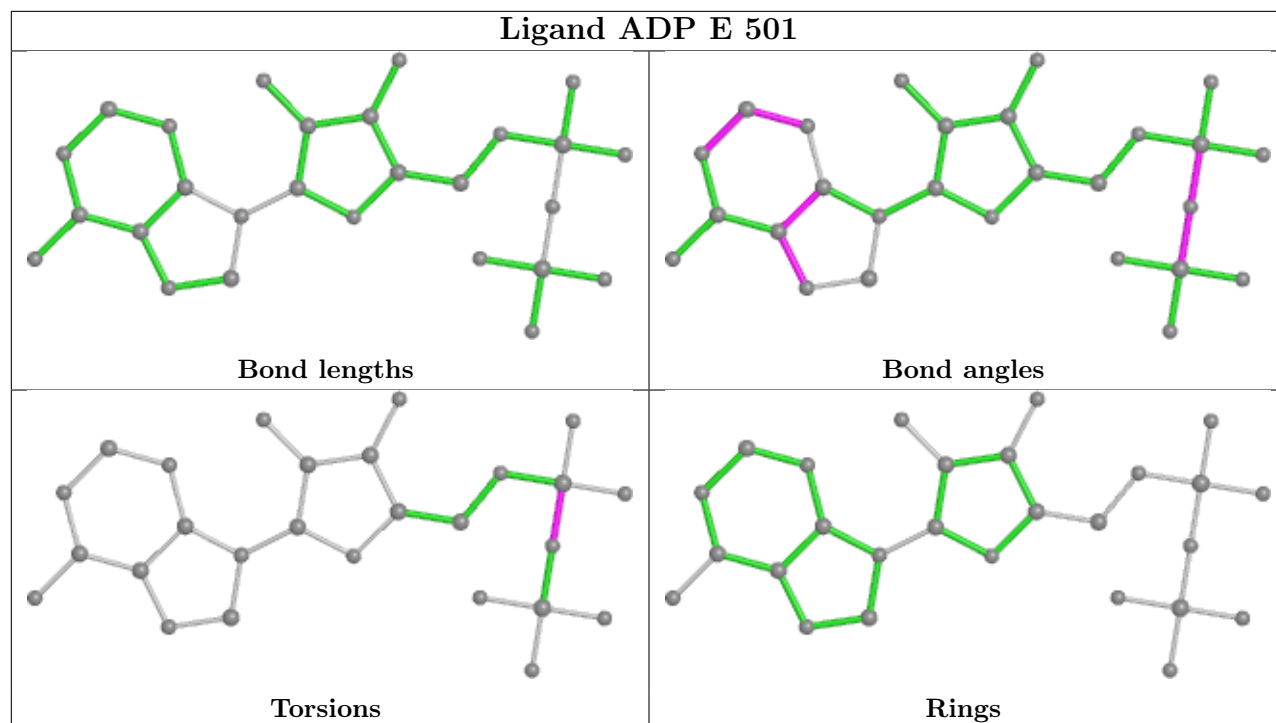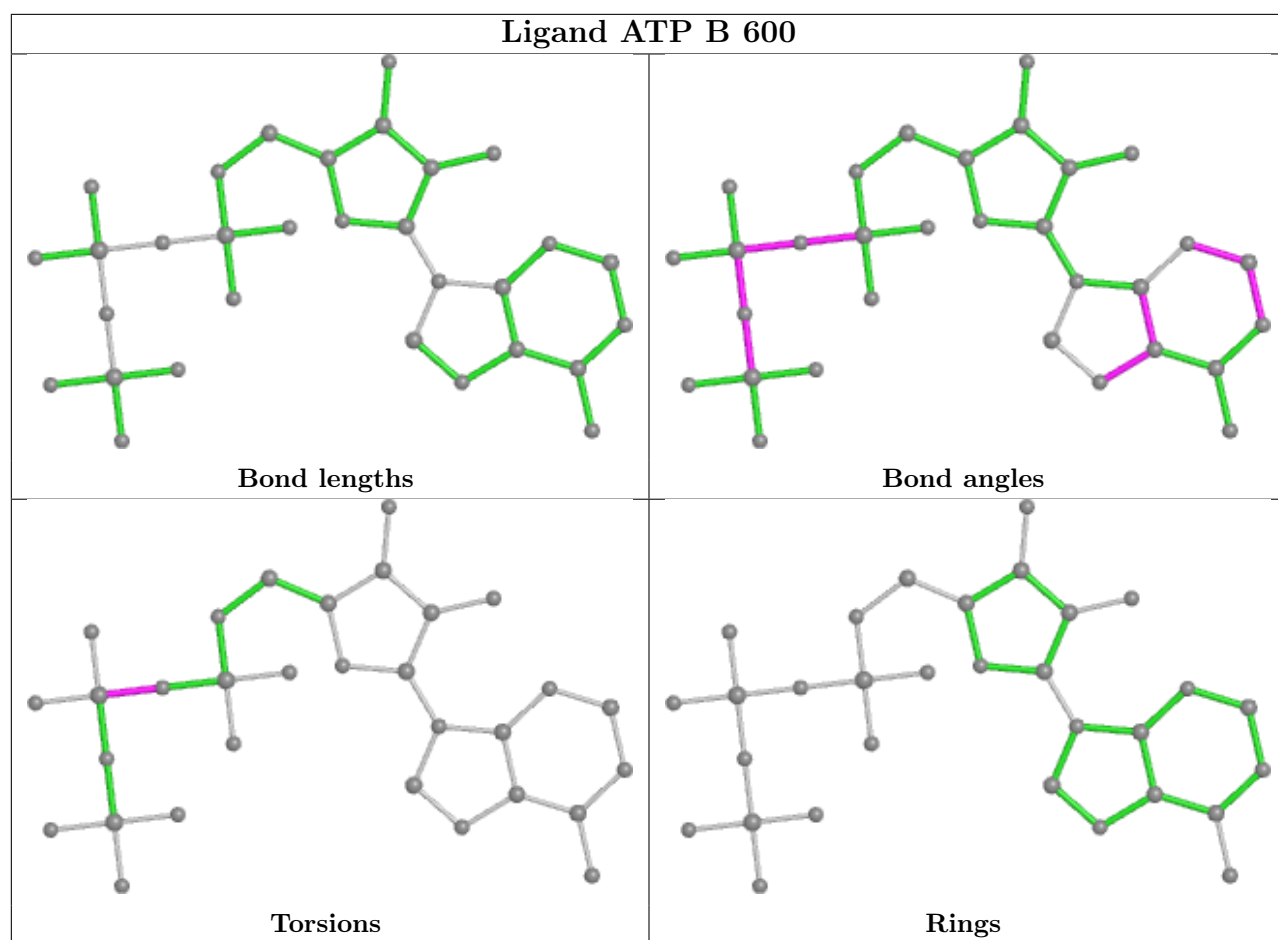
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6   Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-27303. 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
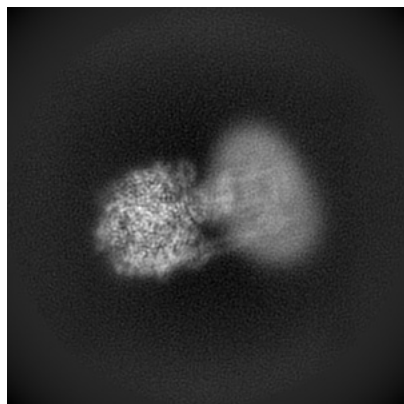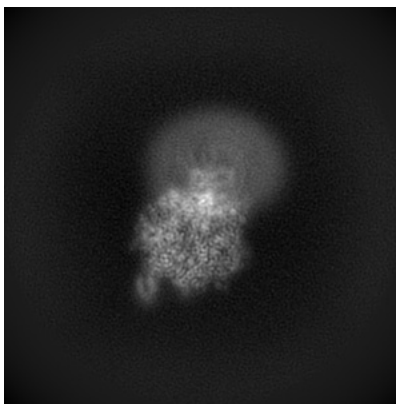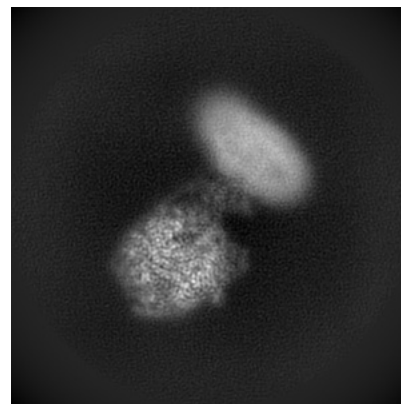
X   Y   Z

6.1.2   Raw map

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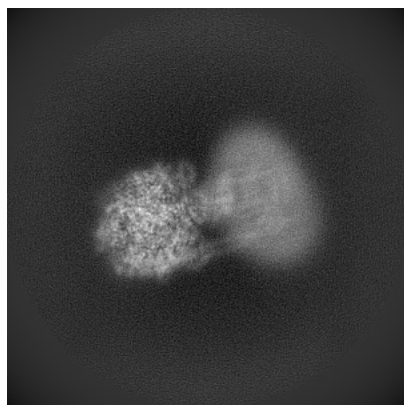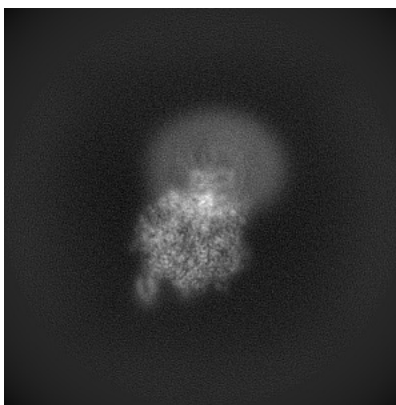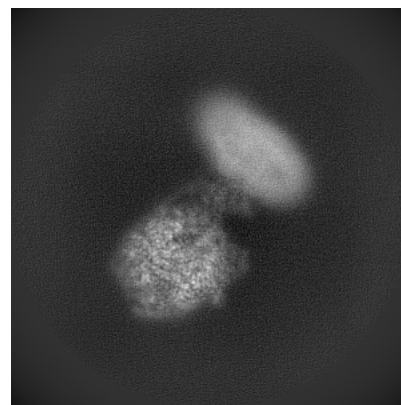
The images above show the map projected in three orthogonal directions.

6.2　Central slices ⓘ
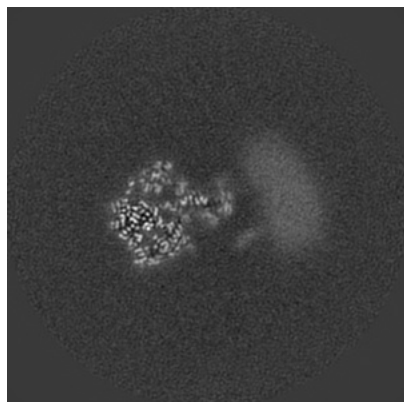
6.2.1　Primary map
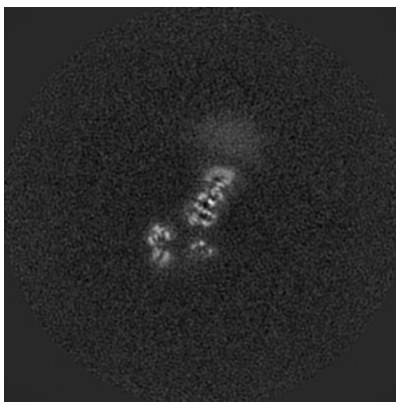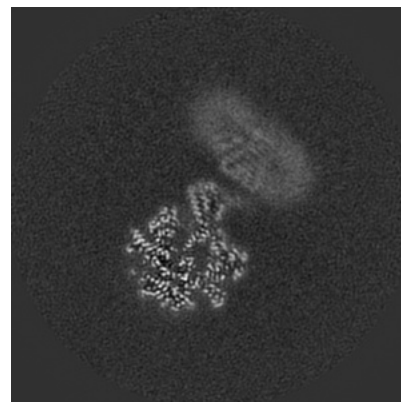
| X Index: 176 | Y Index: 176 | Z Index: 176 |

6.2.2　Raw map
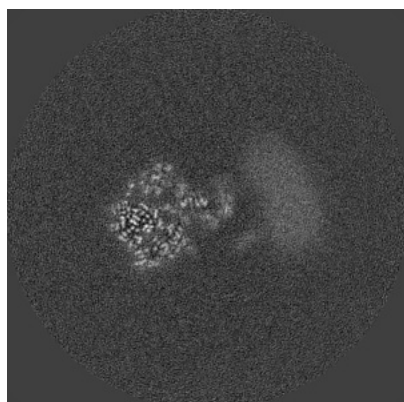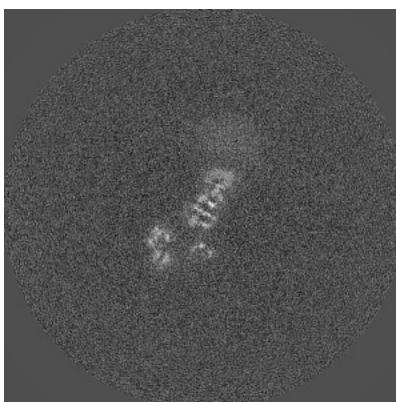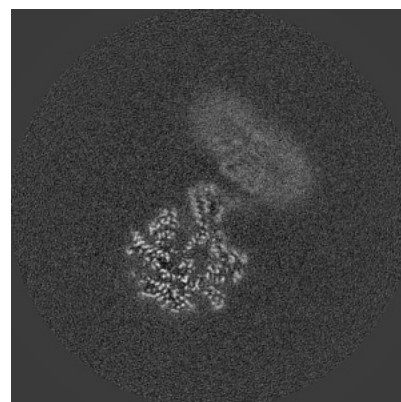
| X Index: 176 | Y Index: 176 | Z Index: 176 |

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

6.3   Largest variance slices ⓘ

6.3.1   Primary map
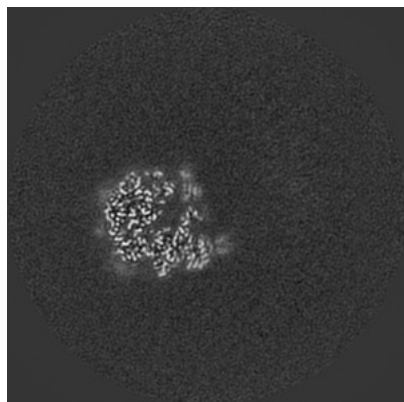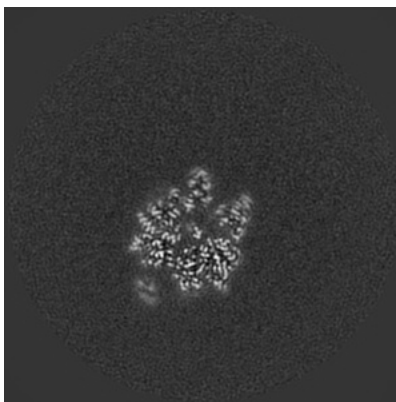
| X Index: 148 | Y Index: 134 | Z Index: 174 |
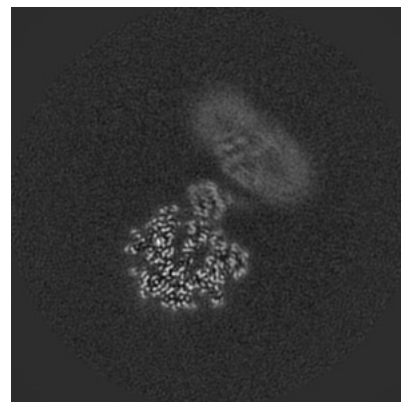
6.3.2   Raw map
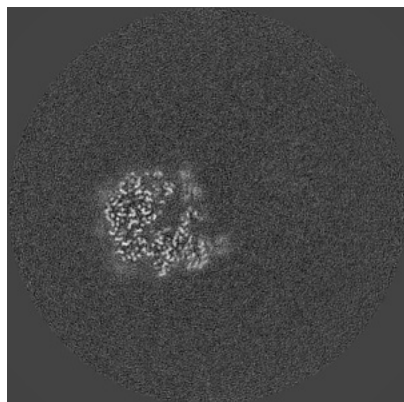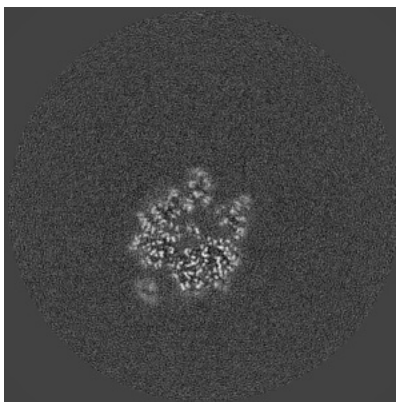
| X Index: 148 | Y Index: 135 | Z Index: 174 |
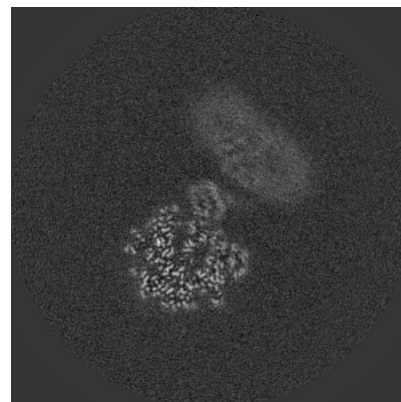
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) ⓘ

6.4.1 Primary map
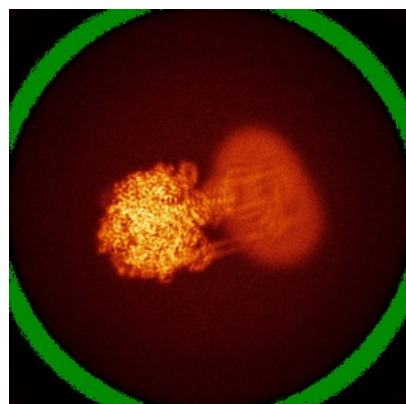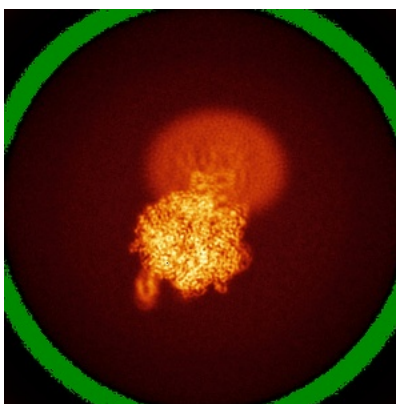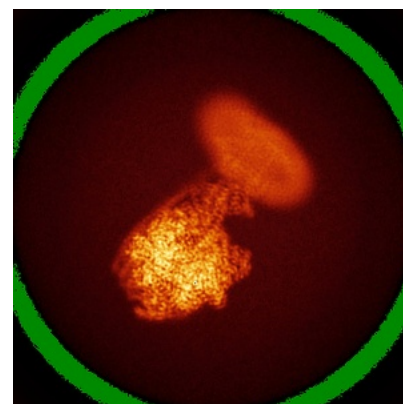
| X | Y | Z |

6.4.2 Raw map

| X | Y | Z |
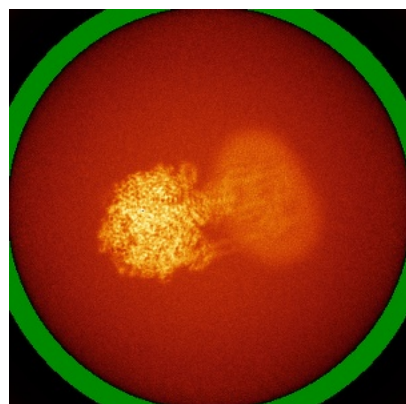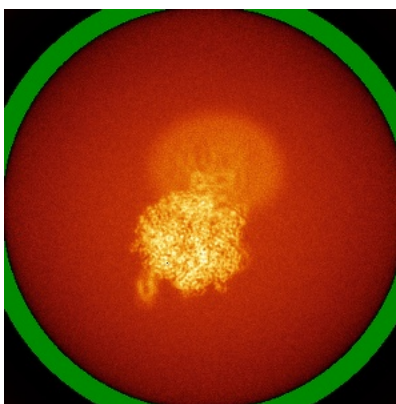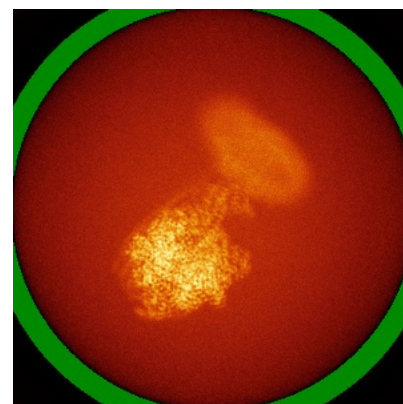
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views ⓘ

6.5.1 Primary map

| X | Y | Z |
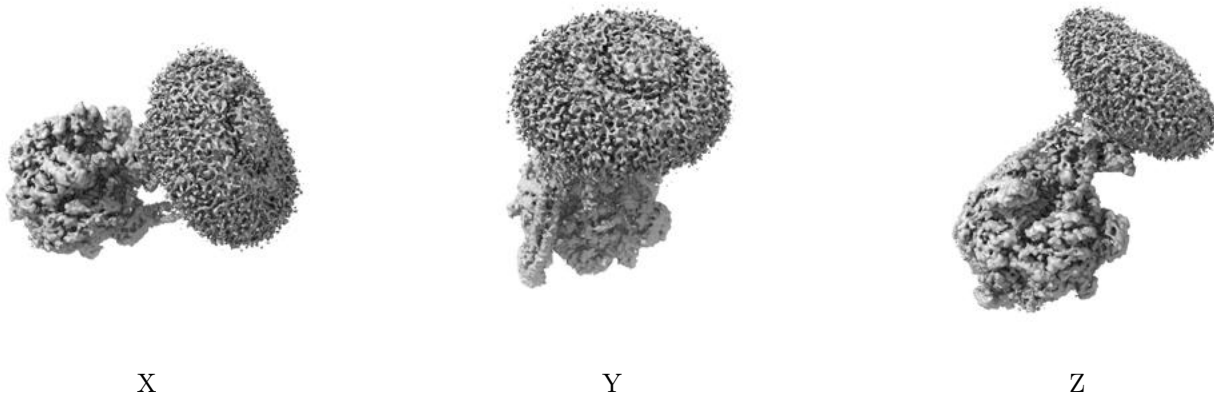
The images above show the 3D surface view of the map at the recommended contour level 0.01. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map

| X | Y | Z |
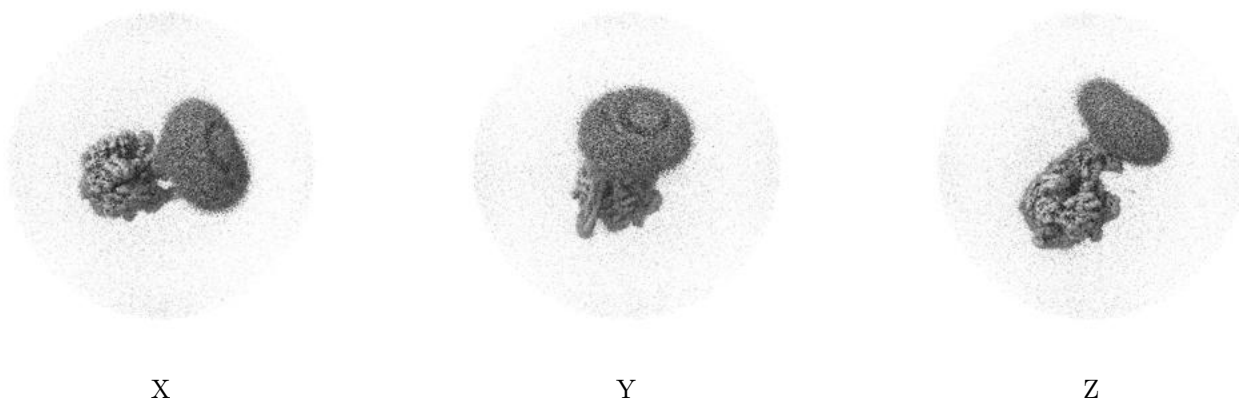
These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

6.6 Mask visualisation ⓘ

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

7   Map analysis ⓘ

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

7.1   Map-value distribution ⓘ
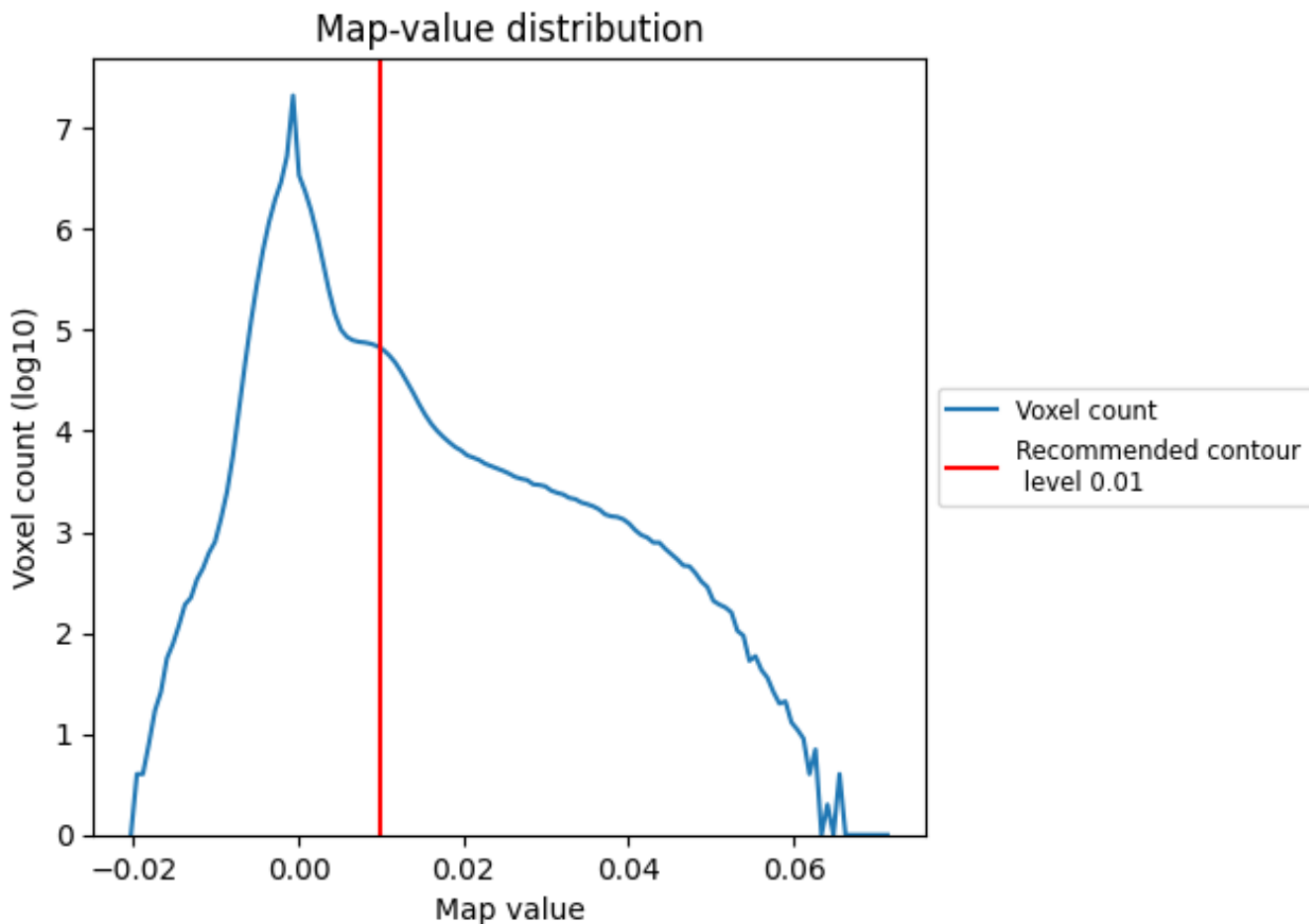
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2   Volume estimate ⓘ
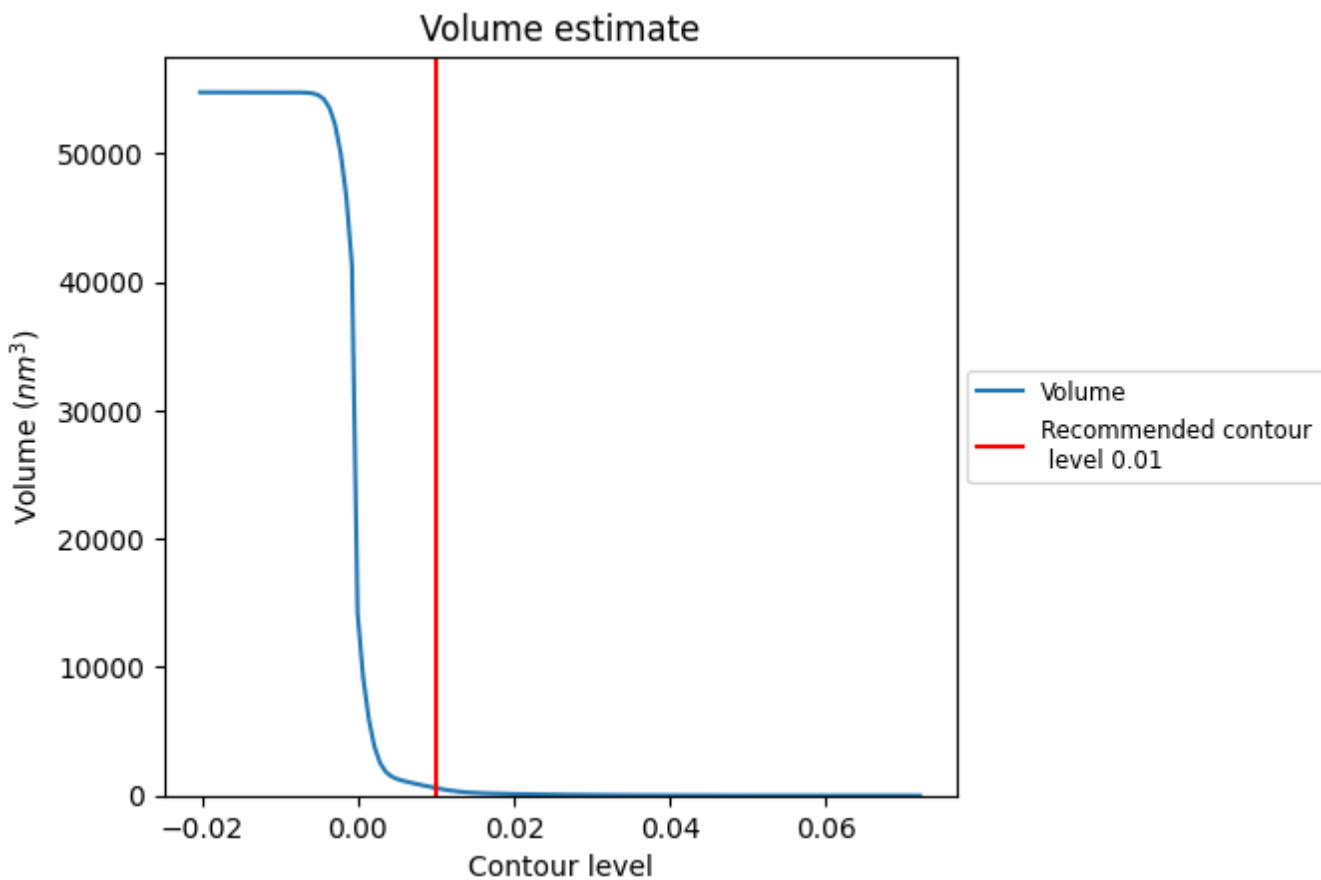
The volume at the recommended contour level is 584 nm^3; this corresponds to an approximate mass of 527 kDa.

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 ⓘ
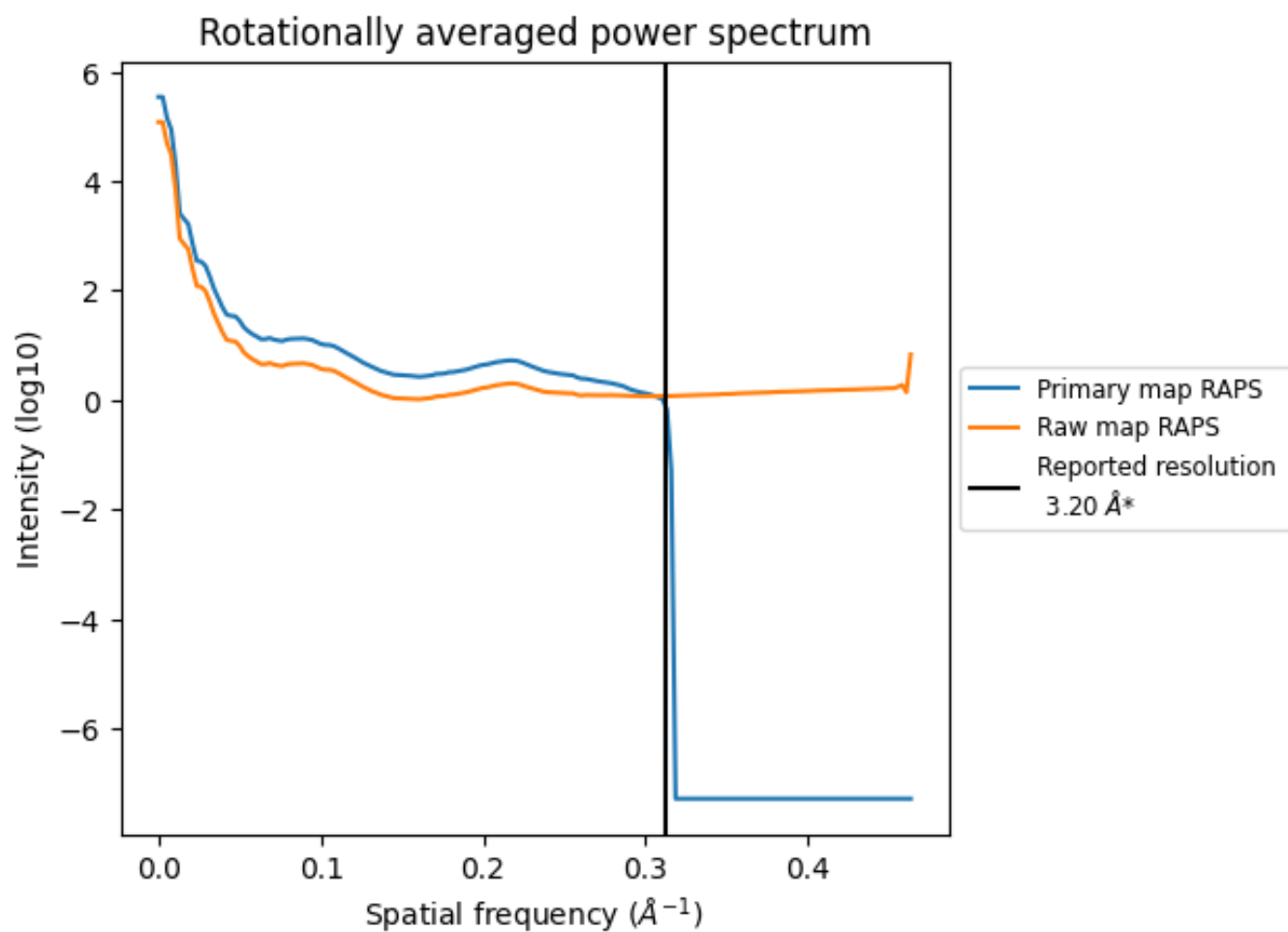
*Reported resolution corresponds to spatial frequency of 0.312 Å^{-1}

8 Fourier-Shell correlation ⓘ

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 ⓘ
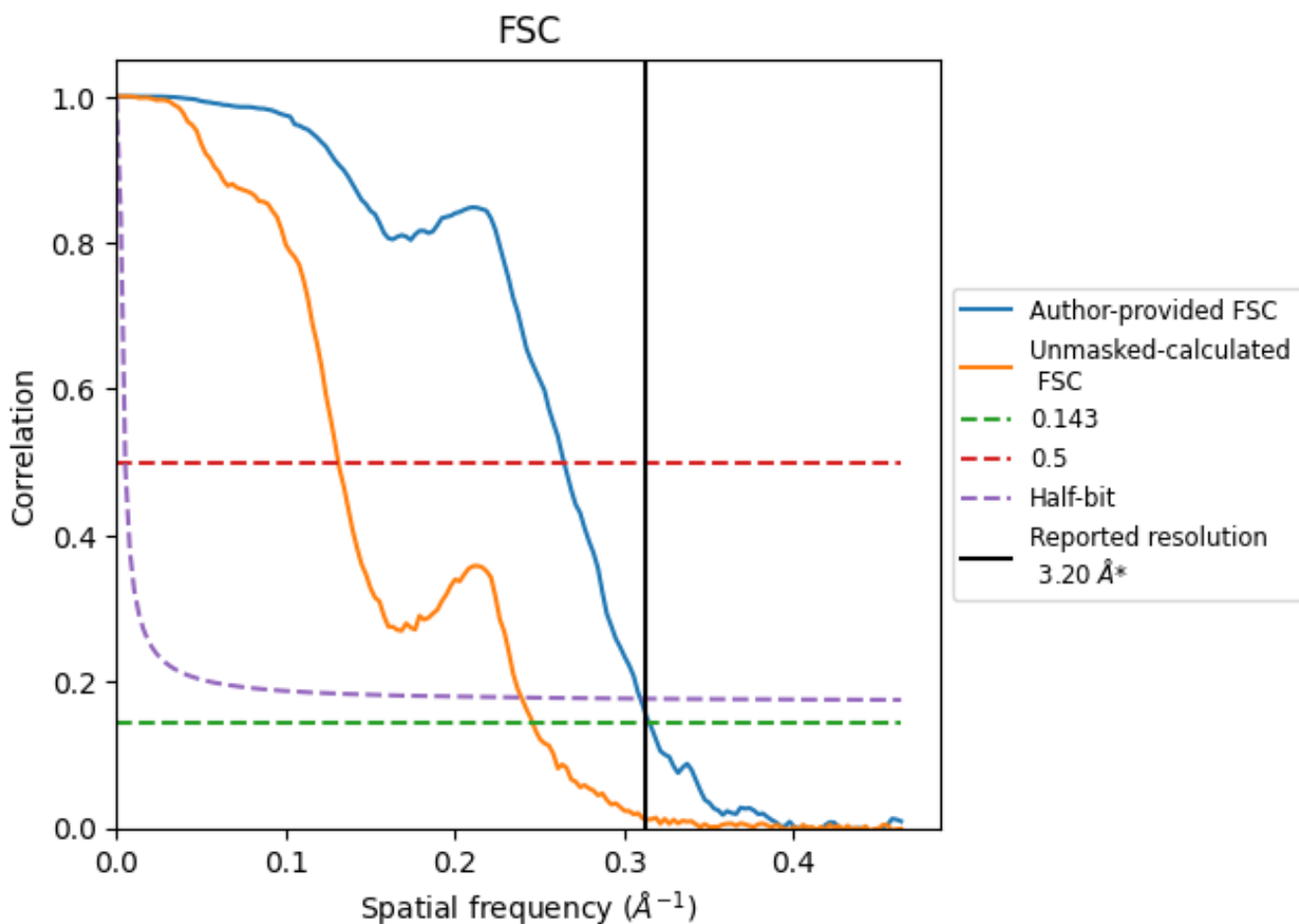
*Reported resolution corresponds to spatial frequency of 0.312 Å^{-1}

8.2   Resolution estimates ⓘ

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.20	-	-
Author-provided FSC curve	3.18	3.78	3.23
Unmasked-calculated*	4.07	7.63	4.18

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.07 differs from the reported value 3.2 by more than 10 %

9   Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-27303 and PDB model 8DBR. Per-residue inclusion information can be found in section 3 on page 9.

9.1   Map-model overlay ⓘ

X   Y   Z
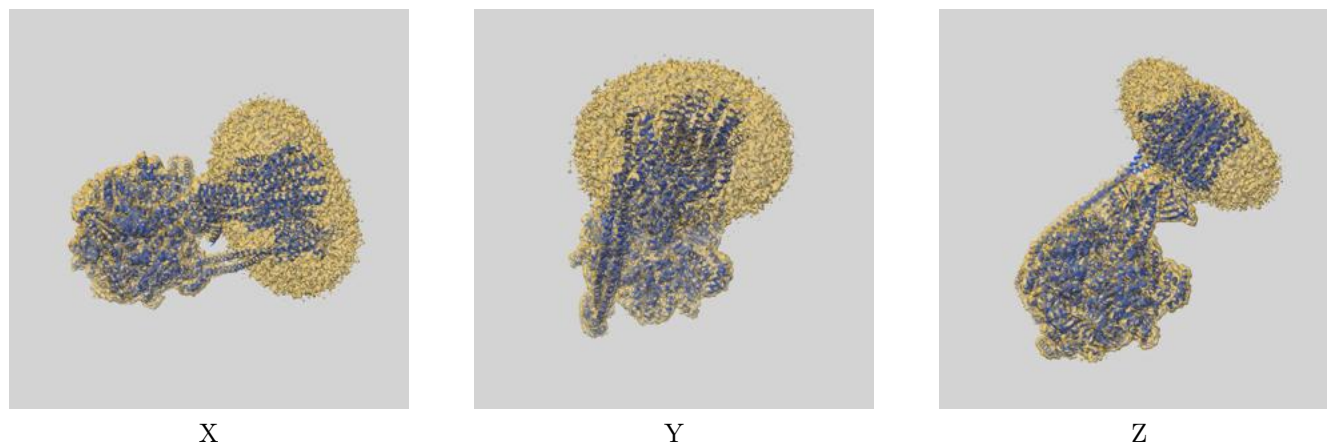
The images above show the 3D surface view of the map at the recommended contour level 0.01 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model ⓘ

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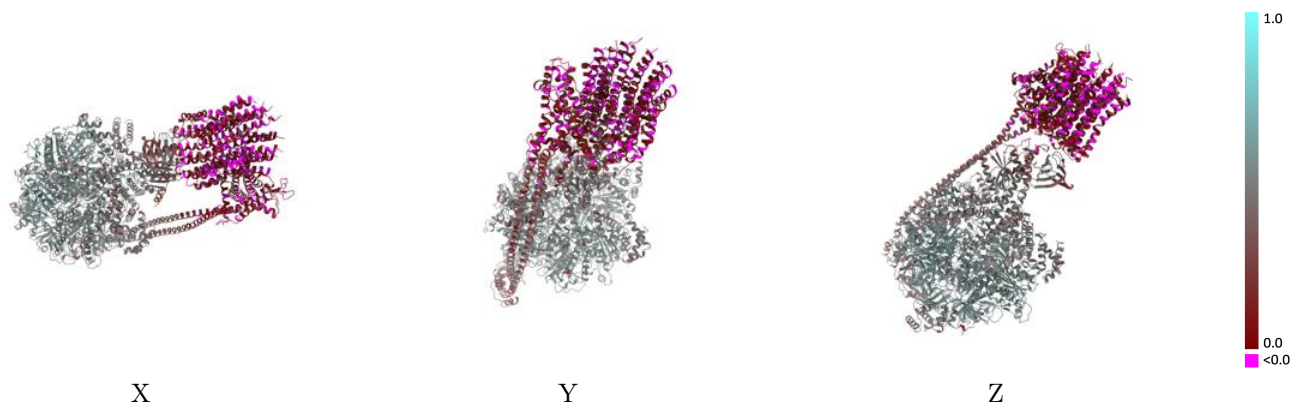
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

X   Y   Z
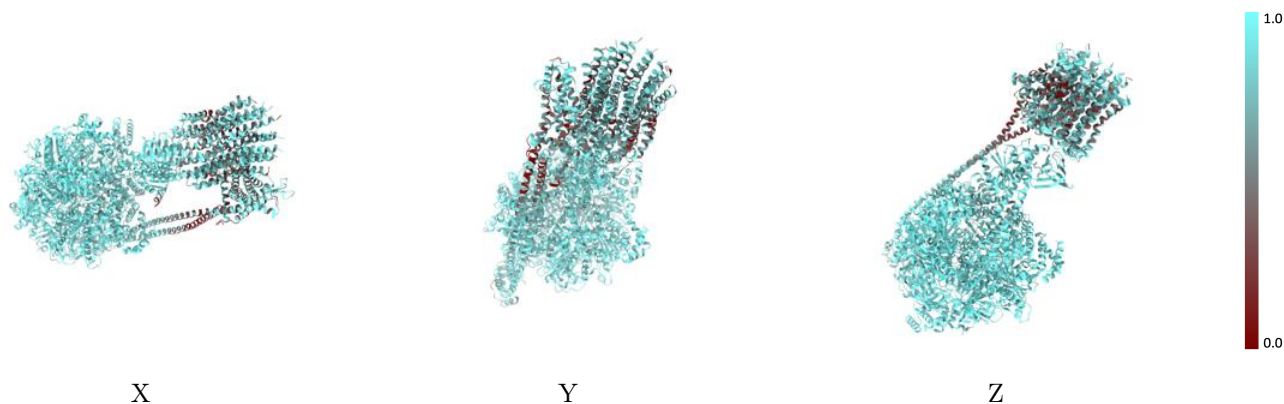
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.01).

9.4 Atom inclusion ⓘ
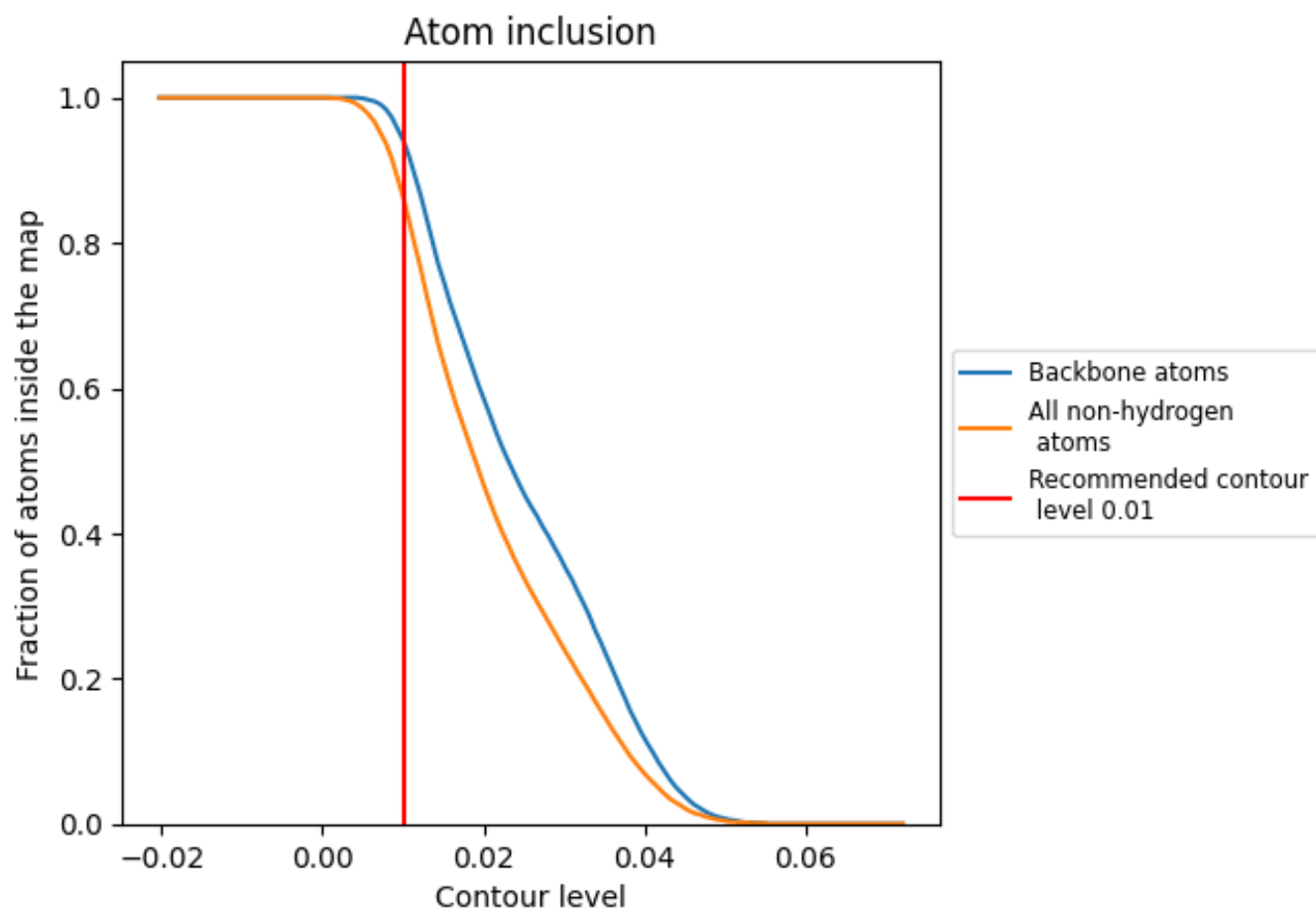
At the recommended contour level, 94% of all backbone atoms, 86% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.01) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8630	0.3920
A	0.9490	0.5130
B	0.9320	0.4940
C	0.9490	0.5130
D	0.9500	0.5310
E	0.9270	0.4940
F	0.9530	0.5250
G	0.8860	0.4190
H	0.7910	0.3440
I	0.7260	0.1230
J	0.6750	0.0760
L	0.6420	0.0590
M	0.6950	0.0640
N	0.6620	0.0300
O	0.7040	0.0880
P	0.7130	0.1120
Q	0.6840	0.0950
R	0.7290	0.0940
S	0.7020	0.0720
W	0.9100	0.4250
X	0.6460	0.2270
Y	0.6610	0.2380
a	0.6830	0.0920

1.0

0.0
<0.0