



Full wwPDB EM Validation Report ⓘ

Dec 18, 2022 – 11:52 pm GMT

PDB ID : 7NJS
EMDB ID : EMD-12417
Title : Mycobacterium smegmatis ATP synthase state 3c
Authors : Montgomery, M.G.; Petri, J.; Spikes, T.E.; Walker, J.E.
Deposited on : 2021-02-17
Resolution : 2.46 Å(reported)

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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:

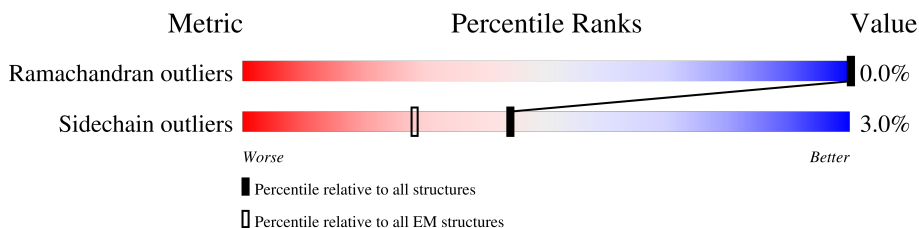
EMDB validation analysis : 0.0.1.dev43
Mogul : 1.8.4, CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.3

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 2.46 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)
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	548	91% 8% 6%
1	B	548	90% 8% 8%
1	C	548	93% 5% 5%
2	D	475	98% ..
2	E	475	96% ..
2	F	475	97% ..
3	G	307	94% 9% ..
4	H	121	94% 26% ..
5	L	86	98% 6% ..

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Mol	Chain	Length	Quality of chain
5	M	86	<p>5% 98%</p>
5	N	86	<p>5% 98%</p>
5	O	86	<p>8% 97%</p>
5	P	86	<p>7% 94%</p>
5	Q	86	<p>8% 95%</p>
5	R	86	<p>5% 97%</p>
5	S	86	<p>5% 97%</p>
5	T	86	<p>1% 97%</p>
6	a	252	<p>12% 92% 6%</p>
7	b	180	<p>23% 77% 20%</p>
8	d	445	<p>25% 92% 6%</p>

2 Entry composition [i](#)

There are 12 unique types of molecules in this entry. The entry contains 74714 atoms, of which 37418 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	
			Total	C	H	N	O			S
1	A	517	Total 7808	C 2451	H 3904	N 674	O 769	S 10	0	0
1	B	503	Total 7623	C 2393	H 3815	N 658	O 747	S 10	2	0
1	C	521	Total 7942	C 2496	H 3977	N 685	O 774	S 10	3	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
2	D	468	Total 7162	C 2265	H 3573	N 616	O 695	S 13	2	0
2	E	464	Total 7087	C 2243	H 3533	N 609	O 689	S 13	0	0
2	F	468	Total 7144	C 2260	H 3564	N 614	O 693	S 13	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
3	G	297	Total 4567	C 1418	H 2290	N 412	O 441	S 6	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
4	H	118	Total 1802	C 565	H 891	N 161	O 184	S 1	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace	
5	L	84	Total	C	H	N	O	S	0	0
			1192	387	603	96	104	2		
5	M	84	Total	C	H	N	O	S	0	0
			1192	387	603	96	104	2		
5	N	84	Total	C	H	N	O	S	0	0
			1192	387	603	96	104	2		
5	O	84	Total	C	H	N	O	S	0	0
			1192	387	603	96	104	2		
5	P	84	Total	C	H	N	O	S	0	0
			1192	387	603	96	104	2		
5	Q	84	Total	C	H	N	O	S	0	0
			1192	387	603	96	104	2		
5	R	84	Total	C	H	N	O	S	0	0
			1192	387	603	96	104	2		
5	S	84	Total	C	H	N	O	S	0	0
			1192	387	603	96	104	2		
5	T	85	Total	C	H	N	O	S	0	0
			1204	391	607	97	107	2		

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

Mol	Chain	Residues	Atoms					AltConf	Trace	
6	a	238	Total	C	H	N	O	S	0	0
			3767	1252	1916	292	301	6		

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

Mol	Chain	Residues	Atoms					AltConf	Trace	
7	b	144	Total	C	H	N	O	S	0	0
			2161	664	1090	193	212	2		

There are 10 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
b	171	HIS	-	expression tag	UNP A0R204
b	172	HIS	-	expression tag	UNP A0R204
b	173	HIS	-	expression tag	UNP A0R204
b	174	HIS	-	expression tag	UNP A0R204
b	175	HIS	-	expression tag	UNP A0R204
b	176	HIS	-	expression tag	UNP A0R204
b	177	HIS	-	expression tag	UNP A0R204
b	178	HIS	-	expression tag	UNP A0R204
b	179	HIS	-	expression tag	UNP A0R204

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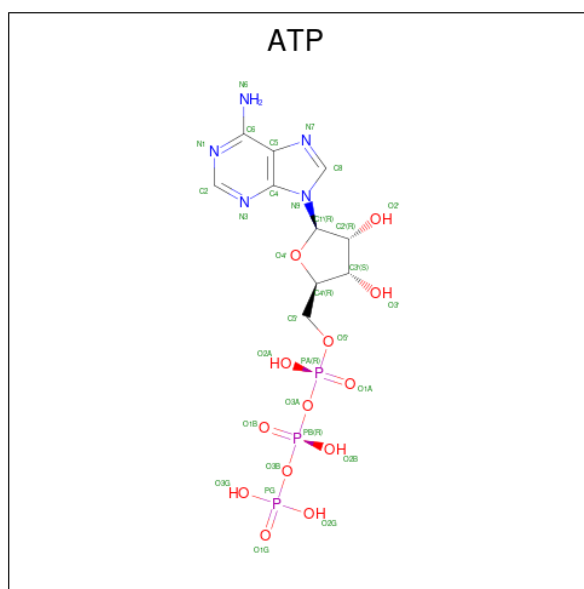
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Chain	Residue	Modelled	Actual	Comment	Reference
b	180	HIS	-	expression tag	UNP A0R204

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

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
8	d	437	6640	2029	3362	596	648	5	0	0

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



Mol	Chain	Residues	Atoms					AltConf	
			Total	C	H	N	O		P
9	A	1	43	10	12	5	13	3	0
9	B	1	43	10	12	5	13	3	0
9	C	1	43	10	12	5	13	3	0
9	F	1	43	10	12	5	13	3	0

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

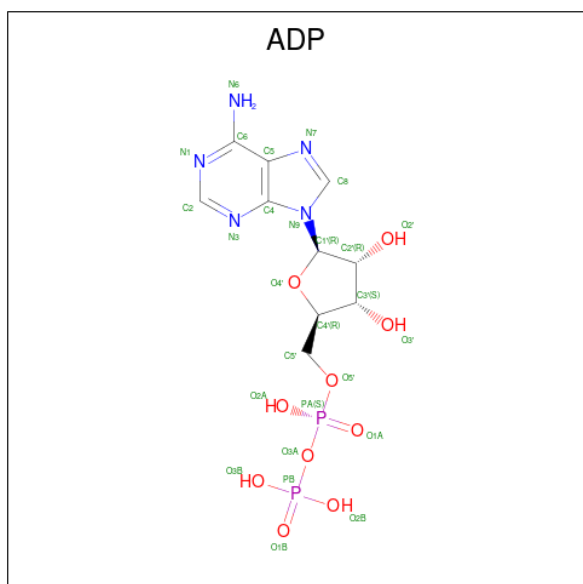
Mol	Chain	Residues	Atoms		AltConf
10	A	1	Total	Mg	0
			1	1	

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Mol	Chain	Residues	Atoms		AltConf
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	F	1	Total	Mg	0
			1	1	

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



Mol	Chain	Residues	Atoms						AltConf
			Total	C	H	N	O	P	
11	D	1	Total	C	H	N	O	P	0
			39	10	12	5	10	2	
11	E	1	Total	C	H	N	O	P	0
			39	10	12	5	10	2	

- Molecule 12 is water.

Mol	Chain	Residues	Atoms		AltConf
12	A	3	Total	O	0
			3	3	
12	B	3	Total	O	0
			3	3	
12	C	3	Total	O	0
			3	3	

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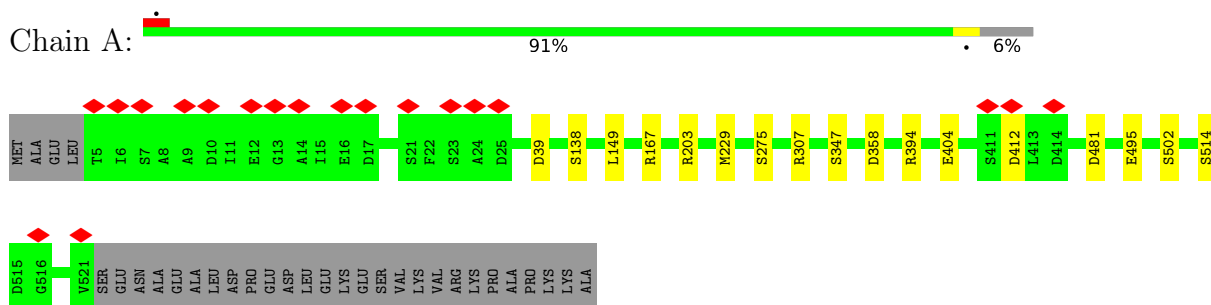
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Mol	Chain	Residues	Atoms		AltConf
12	D	4	Total	O	0
			4	4	
12	F	3	Total	O	0
			3	3	

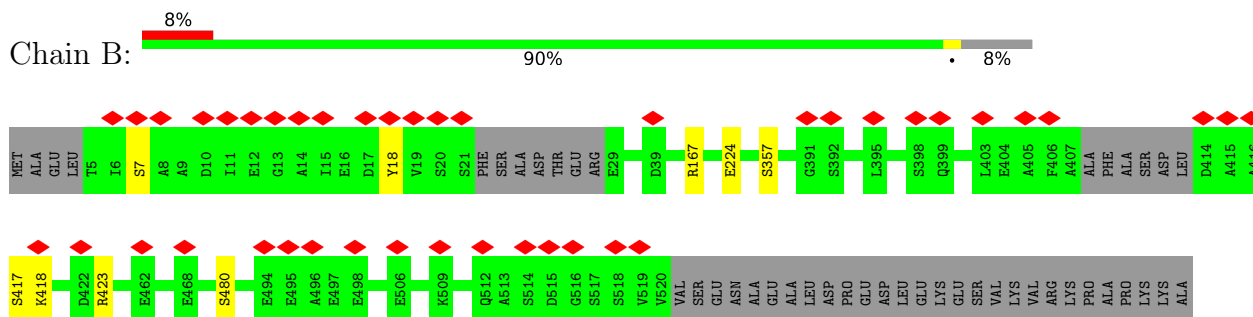
3 Residue-property plots [i](#)

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

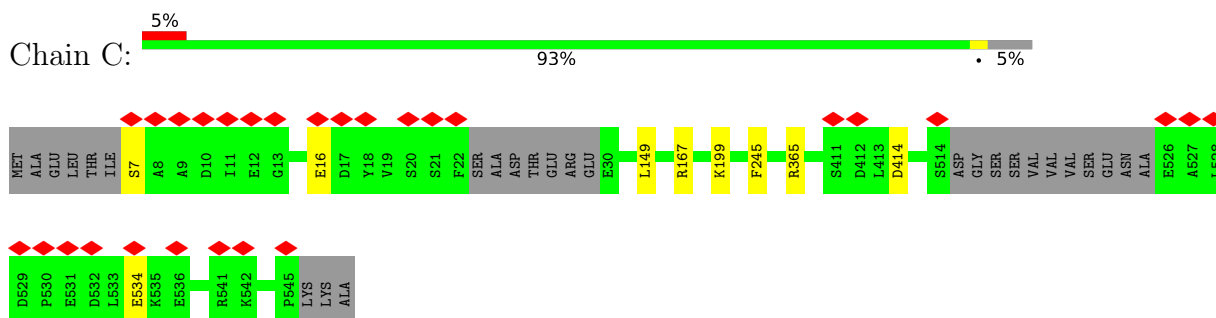
- Molecule 1: ATP synthase subunit alpha



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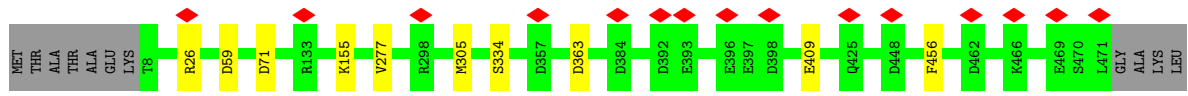


- Molecule 2: ATP synthase subunit beta

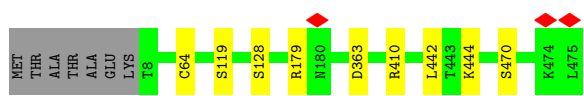




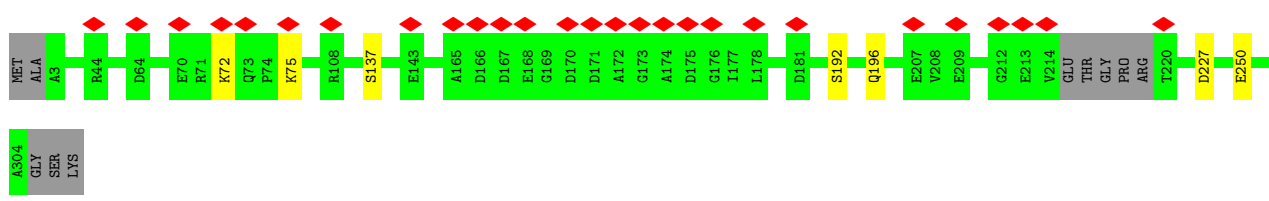
• Molecule 2: ATP synthase subunit beta



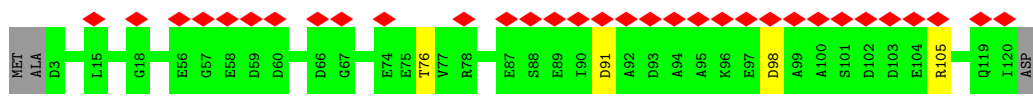
• Molecule 2: ATP synthase subunit beta



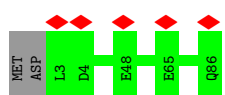
• Molecule 3: ATP synthase gamma chain



• Molecule 4: ATP synthase epsilon chain

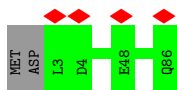


• Molecule 5: ATP synthase subunit c

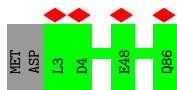


• Molecule 5: ATP synthase subunit c

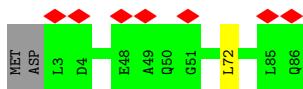




- Molecule 5: ATP synthase subunit c



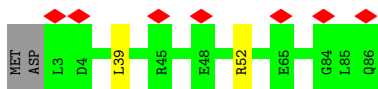
- Molecule 5: ATP synthase subunit c



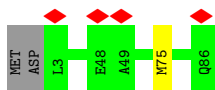
- Molecule 5: ATP synthase subunit c



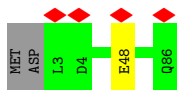
- Molecule 5: ATP synthase subunit c



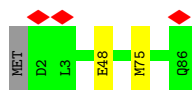
- Molecule 5: ATP synthase subunit c



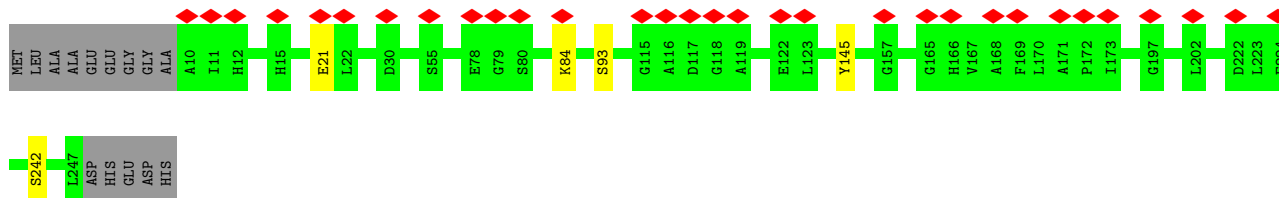
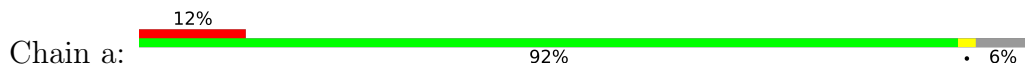
- Molecule 5: ATP synthase subunit c



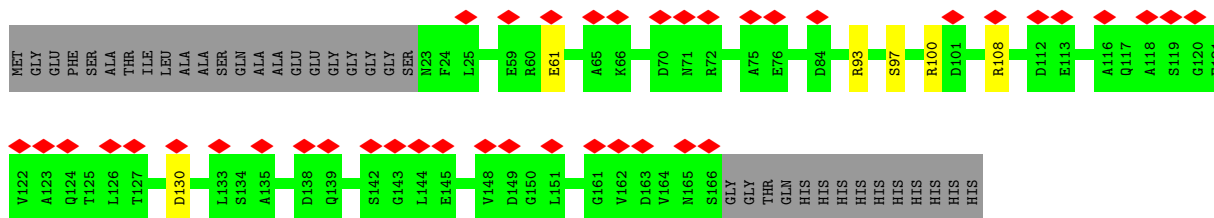
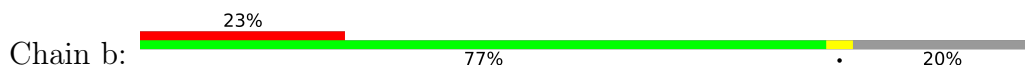
- Molecule 5: ATP synthase subunit c



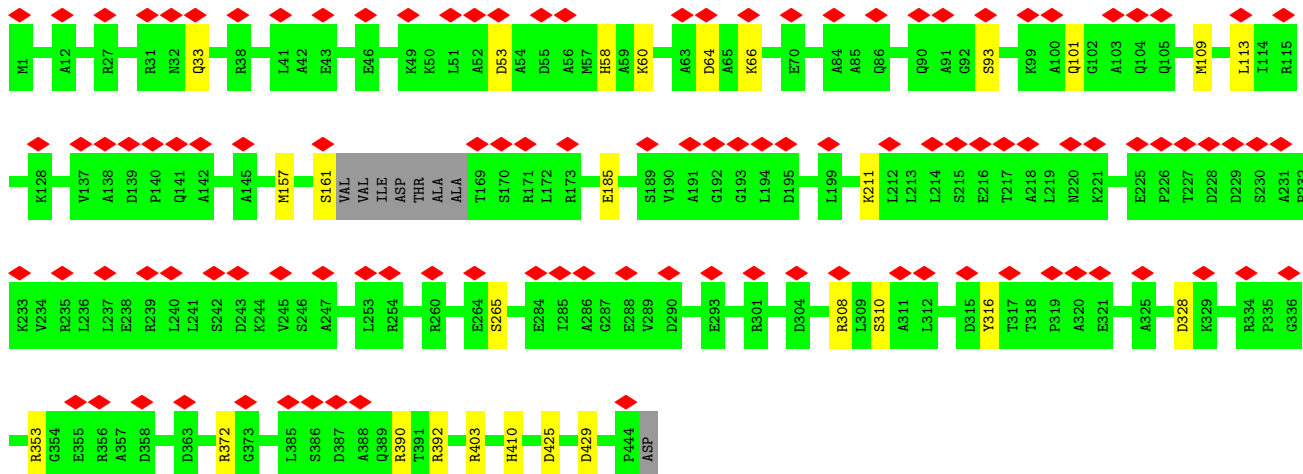
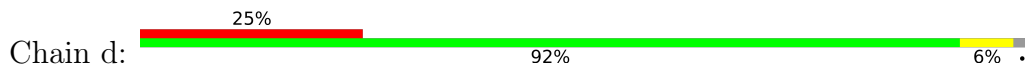
• Molecule 6: ATP synthase subunit a



• Molecule 7: ATP synthase subunit b



• Molecule 8: ATP synthase subunit b-delta



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	37894	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 ($e^-/\text{\AA}^2$)	59.86	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.086	Depositor
Minimum map value	0.000	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.001	Depositor
Recommended contour level	0.0157	Depositor
Map size (Å)	415.0, 415.0, 415.0	wwPDB
Map dimensions	500, 500, 500	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.83, 0.83, 0.83	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: MG, ADP, 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	0.25	0/3964	0.48	0/5368
1	B	0.25	0/3873	0.49	0/5241
1	C	0.25	0/4038	0.48	0/5463
2	D	0.26	0/3659	0.50	0/4961
2	E	0.25	0/3619	0.49	0/4908
2	F	0.26	0/3645	0.50	0/4942
3	G	0.25	0/2306	0.53	0/3117
4	H	0.24	0/922	0.52	0/1252
5	L	0.27	0/600	0.46	0/814
5	M	0.27	0/600	0.44	0/814
5	N	0.26	0/600	0.44	0/814
5	O	0.25	0/600	0.44	0/814
5	P	0.27	0/600	0.45	0/814
5	Q	0.26	0/600	0.46	0/814
5	R	0.26	0/600	0.46	0/814
5	S	0.27	0/600	0.44	0/814
5	T	0.26	0/608	0.44	0/825
6	a	0.25	0/1905	0.41	0/2602
7	b	0.24	0/1080	0.47	0/1459
8	d	0.24	0/3307	0.49	0/4478
All	All	0.25	0/37726	0.48	0/51128

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](#)

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

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	515/548 (94%)	506 (98%)	9 (2%)	0	100	100
1	B	499/548 (91%)	495 (99%)	4 (1%)	0	100	100
1	C	518/548 (94%)	509 (98%)	9 (2%)	0	100	100
2	D	468/475 (98%)	461 (98%)	7 (2%)	0	100	100
2	E	462/475 (97%)	453 (98%)	8 (2%)	1 (0%)	47	57
2	F	466/475 (98%)	457 (98%)	9 (2%)	0	100	100
3	G	293/307 (95%)	289 (99%)	4 (1%)	0	100	100
4	H	116/121 (96%)	112 (97%)	4 (3%)	0	100	100
5	L	82/86 (95%)	77 (94%)	5 (6%)	0	100	100
5	M	82/86 (95%)	80 (98%)	2 (2%)	0	100	100
5	N	82/86 (95%)	80 (98%)	2 (2%)	0	100	100
5	O	82/86 (95%)	81 (99%)	1 (1%)	0	100	100
5	P	82/86 (95%)	81 (99%)	1 (1%)	0	100	100
5	Q	82/86 (95%)	81 (99%)	1 (1%)	0	100	100
5	R	82/86 (95%)	82 (100%)	0	0	100	100
5	S	82/86 (95%)	81 (99%)	1 (1%)	0	100	100
5	T	83/86 (96%)	82 (99%)	1 (1%)	0	100	100
6	a	236/252 (94%)	231 (98%)	5 (2%)	0	100	100
7	b	142/180 (79%)	139 (98%)	3 (2%)	0	100	100
8	d	433/445 (97%)	427 (99%)	6 (1%)	0	100	100
All	All	4887/5148 (95%)	4804 (98%)	82 (2%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	E	277	VAL

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	415/441 (94%)	398 (96%)	17 (4%)	30	40
1	B	406/441 (92%)	397 (98%)	9 (2%)	52	64
1	C	422/441 (96%)	413 (98%)	9 (2%)	53	66
2	D	384/388 (99%)	380 (99%)	4 (1%)	76	84
2	E	381/388 (98%)	372 (98%)	9 (2%)	49	61
2	F	383/388 (99%)	374 (98%)	9 (2%)	50	63
3	G	231/238 (97%)	224 (97%)	7 (3%)	41	52
4	H	94/96 (98%)	90 (96%)	4 (4%)	29	38
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
5	O	54/56 (96%)	53 (98%)	1 (2%)	57	69
5	P	54/56 (96%)	51 (94%)	3 (6%)	21	27
5	Q	54/56 (96%)	52 (96%)	2 (4%)	34	45
5	R	54/56 (96%)	53 (98%)	1 (2%)	57	69
5	S	54/56 (96%)	53 (98%)	1 (2%)	57	69
5	T	55/56 (98%)	53 (96%)	2 (4%)	35	46
6	a	191/200 (96%)	186 (97%)	5 (3%)	46	58
7	b	110/134 (82%)	104 (94%)	6 (6%)	21	27
8	d	341/347 (98%)	314 (92%)	27 (8%)	12	14
All	All	3845/4006 (96%)	3729 (97%)	116 (3%)	44	52

All (116) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	39	ASP
1	A	138	SER
1	A	149	LEU
1	A	167	ARG
1	A	203	ARG
1	A	229	MET
1	A	275	SER
1	A	307	ARG
1	A	347	SER
1	A	358	ASP
1	A	394	ARG
1	A	404	GLU
1	A	412	ASP
1	A	481	ASP
1	A	495	GLU
1	A	502	SER
1	A	514	SER
1	B	7	SER
1	B	18	TYR
1	B	167	ARG
1	B	224	GLU
1	B	357	SER
1	B	417	SER
1	B	418	LYS
1	B	423	ARG
1	B	480	SER
1	C	7	SER
1	C	16	GLU
1	C	149	LEU
1	C	167	ARG
1	C	199	LYS
1	C	245	PHE
1	C	365	ARG
1	C	414	ASP
1	C	534	GLU
2	D	64	CYS
2	D	179	ARG
2	D	305	MET
2	D	410	ARG
2	E	26	ARG
2	E	59	ASP
2	E	71	ASP
2	E	155	LYS

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Mol	Chain	Res	Type
2	E	305	MET
2	E	334	SER
2	E	363	ASP
2	E	409	GLU
2	E	456	PHE
2	F	64	CYS
2	F	119	SER
2	F	128	SER
2	F	179	ARG
2	F	363	ASP
2	F	410	ARG
2	F	442	LEU
2	F	444	LYS
2	F	470	SER
3	G	72	LYS
3	G	75	LYS
3	G	137	SER
3	G	192	SER
3	G	196	GLN
3	G	227	ASP
3	G	250	GLU
4	H	76	THR
4	H	91	ASP
4	H	98	ASP
4	H	105	ARG
5	O	72	LEU
5	P	3	LEU
5	P	6	ASN
5	P	86	GLN
5	Q	39	LEU
5	Q	52	ARG
5	R	75	MET
5	S	48	GLU
5	T	48	GLU
5	T	75	MET
6	a	21	GLU
6	a	84	LYS
6	a	93	SER
6	a	145	TYR
6	a	242	SER
7	b	61	GLU
7	b	93	ARG

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Mol	Chain	Res	Type
7	b	97	SER
7	b	100	ARG
7	b	108	ARG
7	b	130	ASP
8	d	33	GLN
8	d	53	ASP
8	d	58	HIS
8	d	60	LYS
8	d	64	ASP
8	d	66	LYS
8	d	93	SER
8	d	101	GLN
8	d	109	MET
8	d	113	LEU
8	d	157	MET
8	d	161	SER
8	d	185	GLU
8	d	211	LYS
8	d	265	SER
8	d	308	ARG
8	d	310	SER
8	d	316	TYR
8	d	328	ASP
8	d	353	ARG
8	d	372	ARG
8	d	390	ARG
8	d	392	ARG
8	d	403	ARG
8	d	410	HIS
8	d	425	ASP
8	d	429	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
3	G	196	GLN

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 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	0.63	0	31,52,52	1.07	2 (6%)
9	ATP	B	600	10	26,33,33	0.63	0	31,52,52	1.08	2 (6%)
11	ADP	D	600	10	24,29,29	0.96	1 (4%)	29,45,45	1.38	5 (17%)
9	ATP	F	600	10	26,33,33	0.64	0	31,52,52	1.05	2 (6%)
11	ADP	E	600	-	24,29,29	0.96	1 (4%)	29,45,45	1.53	4 (13%)
9	ATP	A	600	10	26,33,33	0.63	0	31,52,52	1.07	2 (6%)

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	-	1/18/38/38	0/3/3/3
9	ATP	B	600	10	-	1/18/38/38	0/3/3/3
11	ADP	D	600	10	-	7/12/32/32	0/3/3/3
9	ATP	F	600	10	-	2/18/38/38	0/3/3/3
11	ADP	E	600	-	-	1/12/32/32	0/3/3/3
9	ATP	A	600	10	-	0/18/38/38	0/3/3/3

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
11	E	600	ADP	C5-C4	2.39	1.47	1.40
11	D	600	ADP	C5-C4	2.32	1.47	1.40

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
11	D	600	ADP	N3-C2-N1	-3.65	122.98	128.68
11	E	600	ADP	N3-C2-N1	-3.63	123.01	128.68
11	D	600	ADP	PA-O3A-PB	-3.56	120.60	132.83
11	E	600	ADP	C3'-C2'-C1'	3.55	106.32	100.98
11	E	600	ADP	PA-O3A-PB	-3.47	120.92	132.83
11	E	600	ADP	C4-C5-N7	-2.60	106.69	109.40
11	D	600	ADP	C4-C5-N7	-2.45	106.85	109.40
9	A	600	ATP	C5-C6-N6	2.34	123.90	120.35
9	F	600	ATP	C5-C6-N6	2.32	123.89	120.35
9	B	600	ATP	C5-C6-N6	2.32	123.88	120.35
9	C	600	ATP	C5-C6-N6	2.28	123.82	120.35
11	D	600	ADP	C3'-C2'-C1'	2.20	104.30	100.98
9	C	600	ATP	PB-O3B-PG	2.09	139.98	132.83
9	B	600	ATP	PB-O3B-PG	2.08	139.96	132.83
9	F	600	ATP	PB-O3B-PG	2.06	139.91	132.83
9	A	600	ATP	PB-O3B-PG	2.05	139.87	132.83
11	D	600	ADP	C2-N1-C6	2.00	122.18	118.75

There are no chirality outliers.

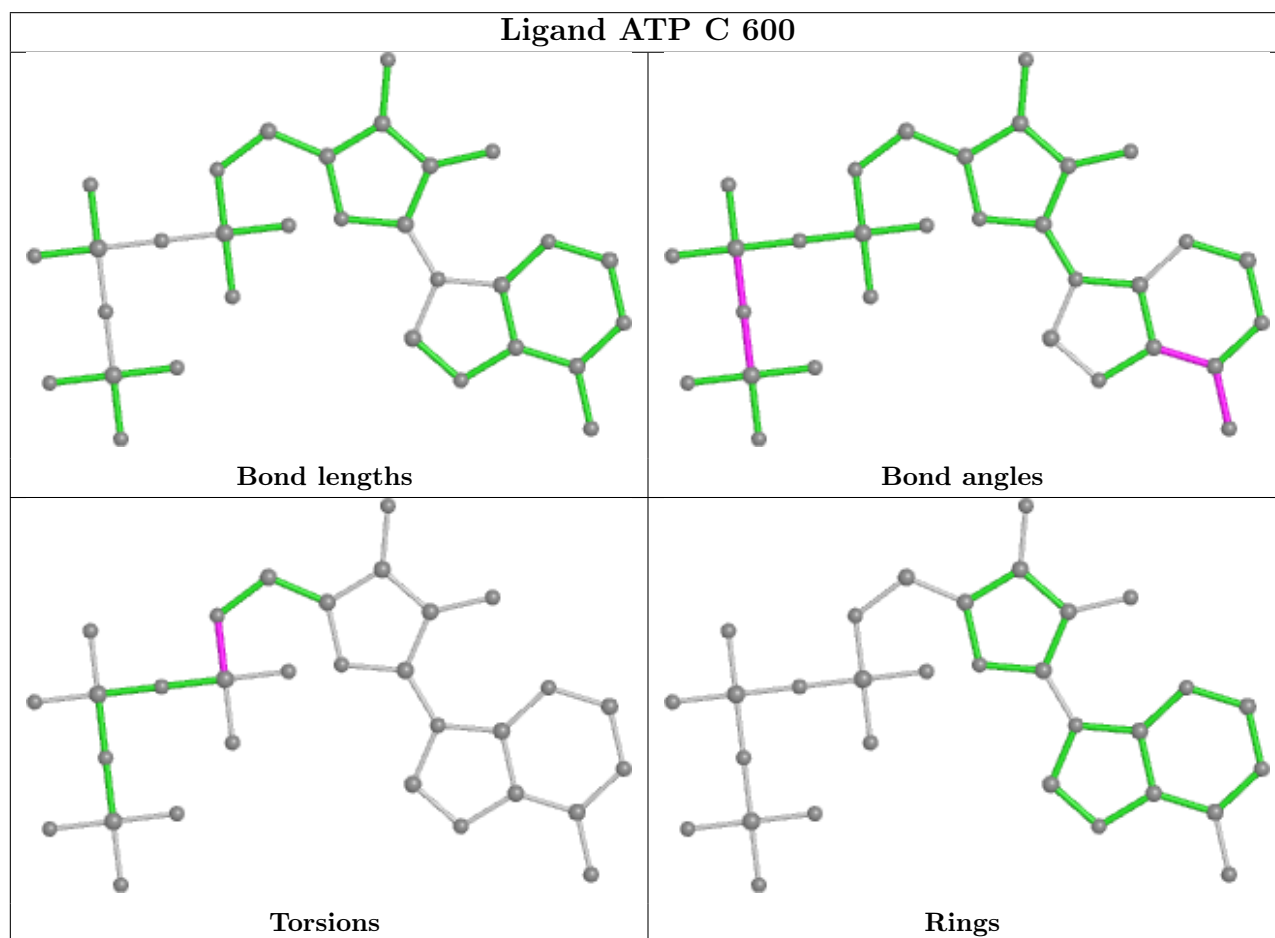
All (12) torsion outliers are listed below:

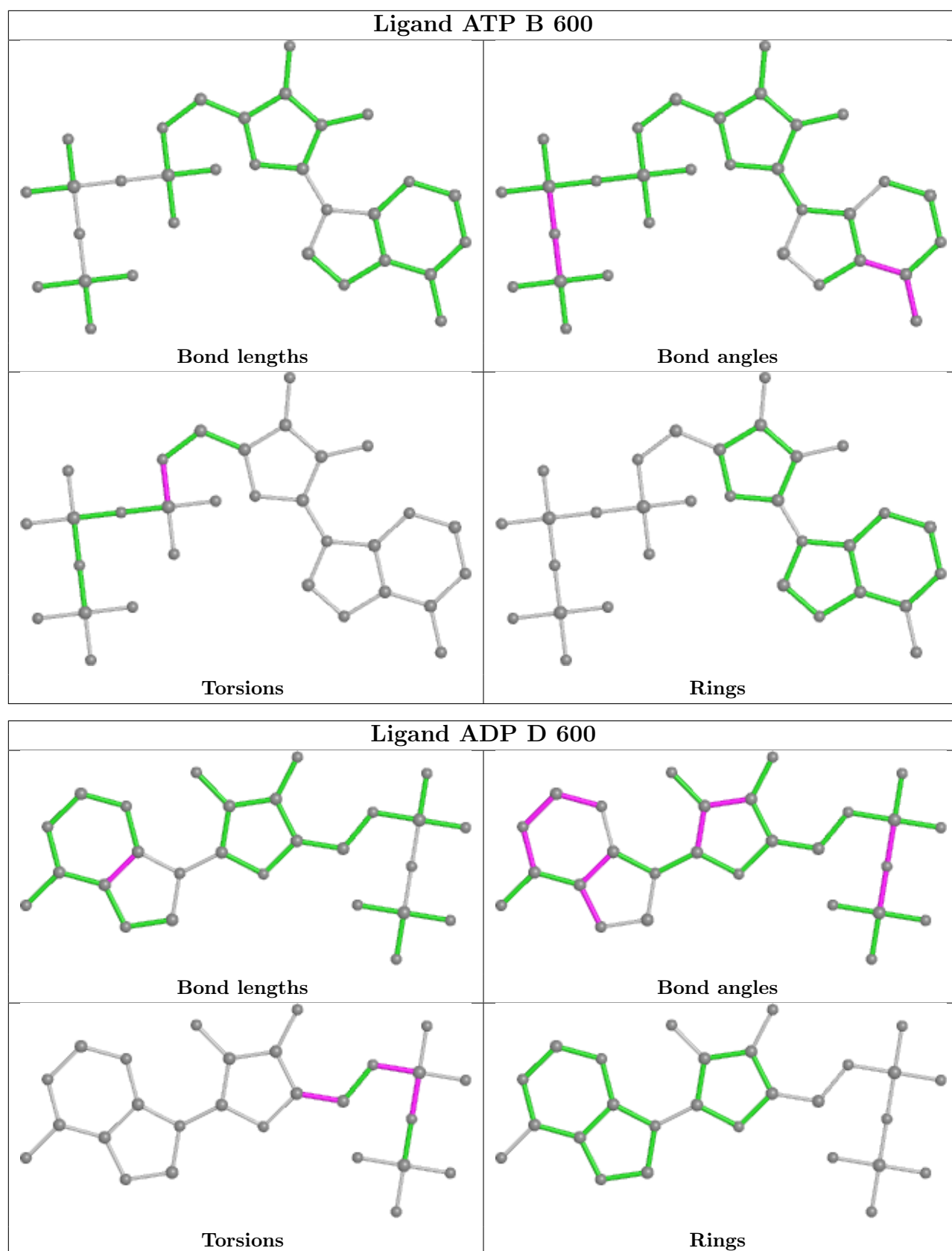
Mol	Chain	Res	Type	Atoms
11	D	600	ADP	C5'-O5'-PA-O3A
9	F	600	ATP	PA-O3A-PB-O1B
11	D	600	ADP	PB-O3A-PA-O2A
11	D	600	ADP	C5'-O5'-PA-O1A
11	D	600	ADP	C5'-O5'-PA-O2A
11	D	600	ADP	O4'-C4'-C5'-O5'
9	F	600	ATP	PA-O3A-PB-O2B
11	D	600	ADP	PB-O3A-PA-O1A
9	B	600	ATP	C5'-O5'-PA-O1A
9	C	600	ATP	C5'-O5'-PA-O1A
11	D	600	ADP	C3'-C4'-C5'-O5'
11	E	600	ADP	O4'-C4'-C5'-O5'

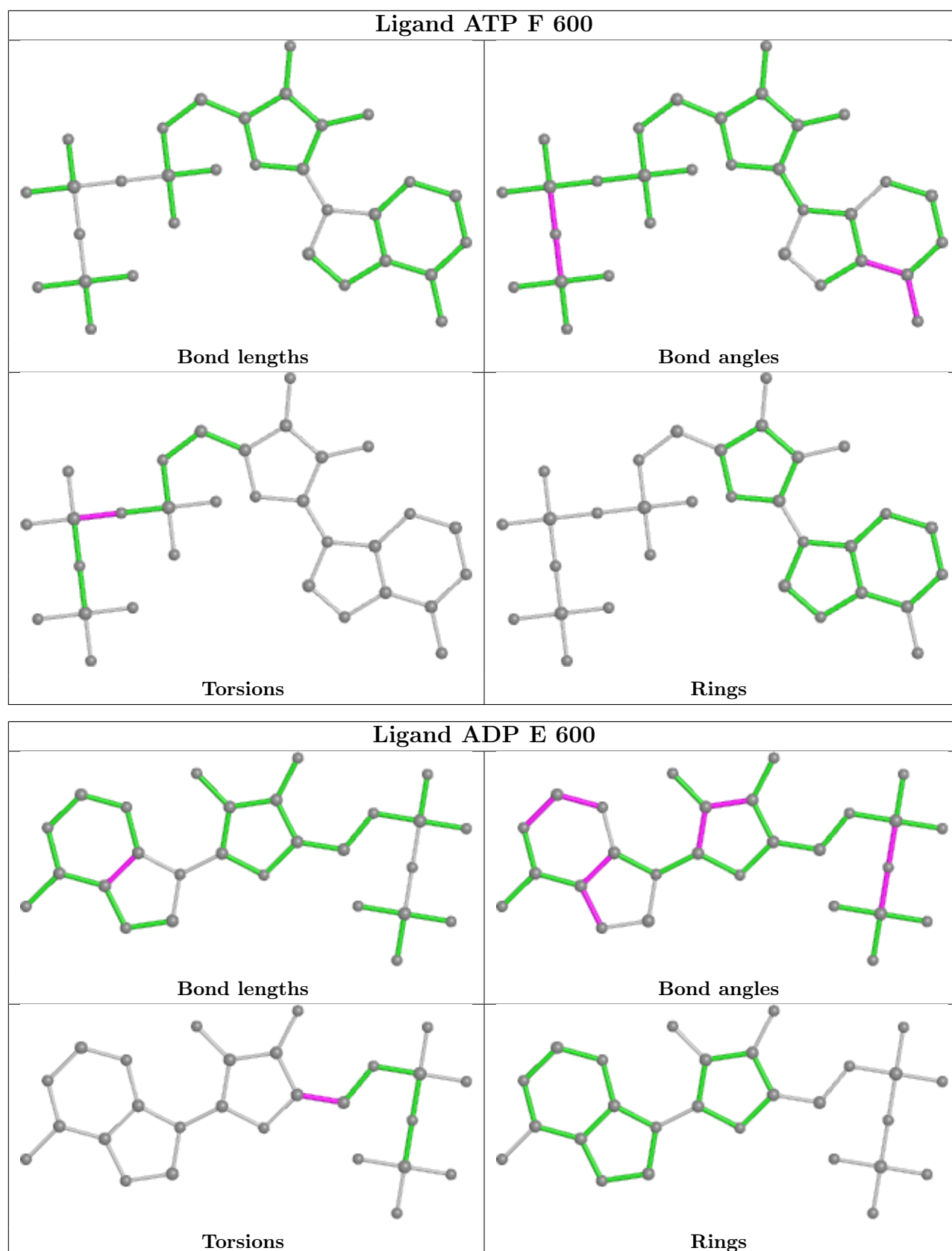
There are no ring outliers.

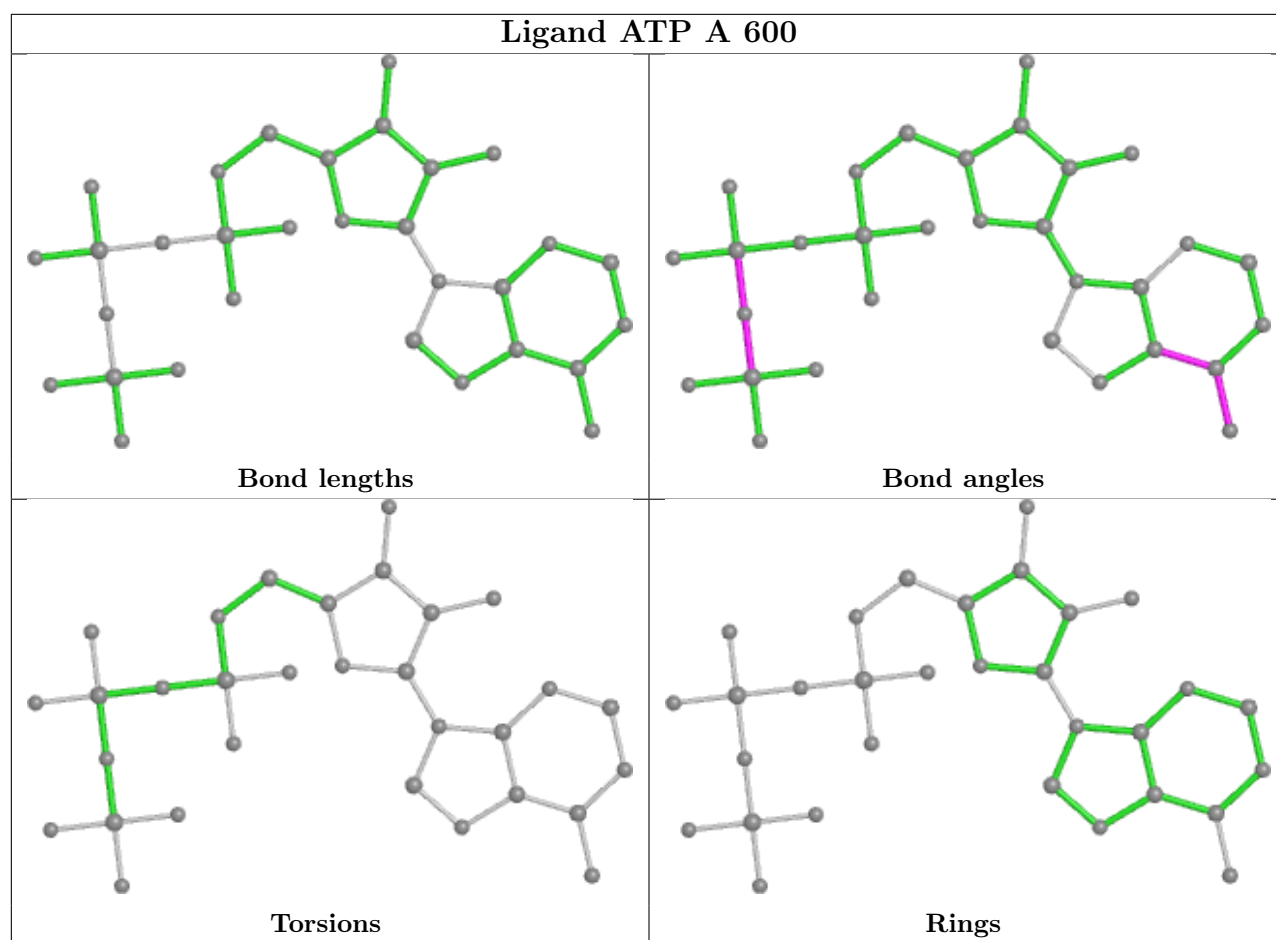
No monomer is involved in short contacts.

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 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.

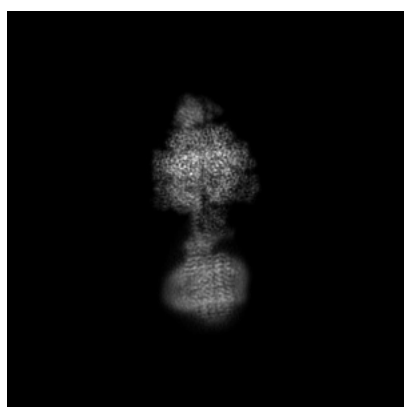
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-12417. These allow visual inspection of the internal detail of the map and identification of artifacts.

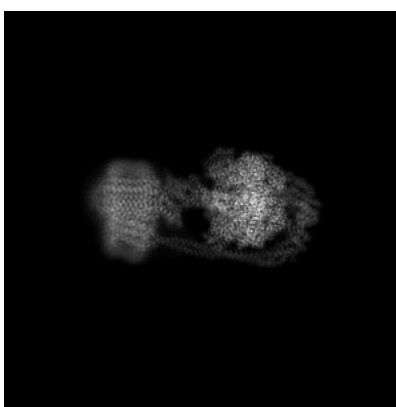
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

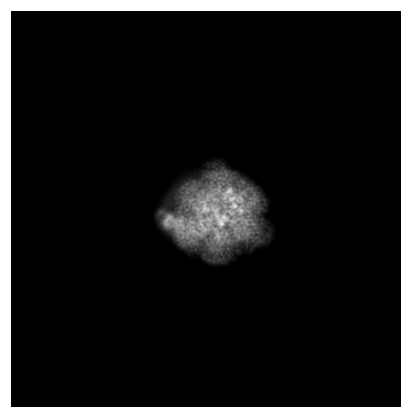
6.1.1 Primary map



X



Y

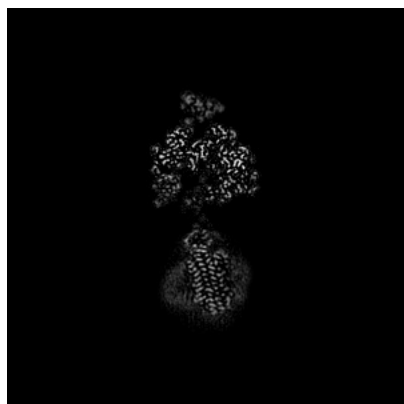


Z

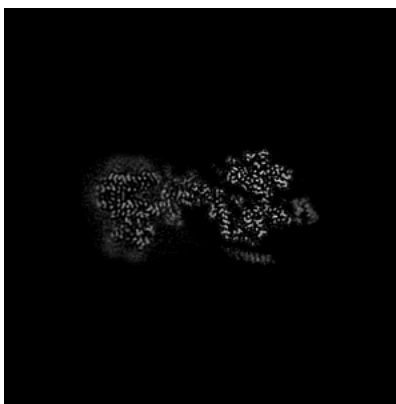
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

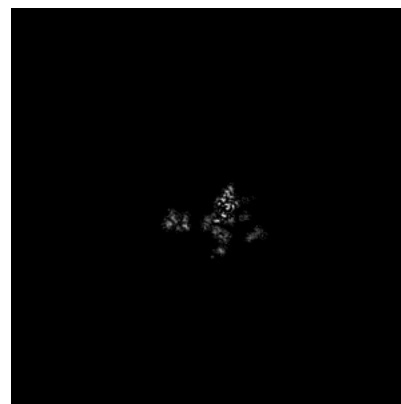
6.2.1 Primary map



X Index: 250



Y Index: 250

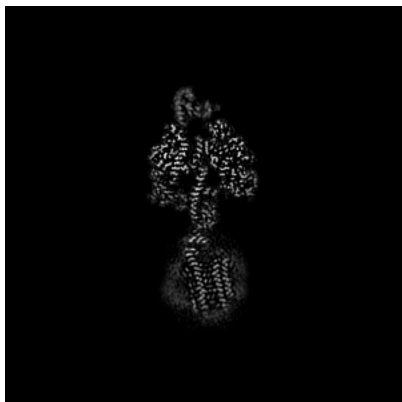


Z Index: 250

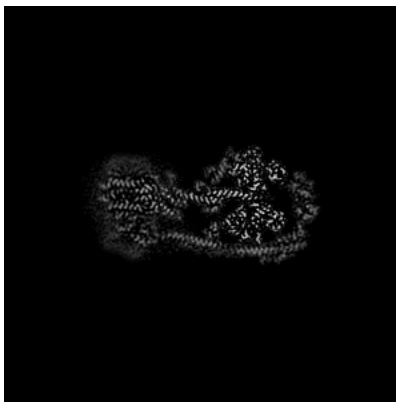
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

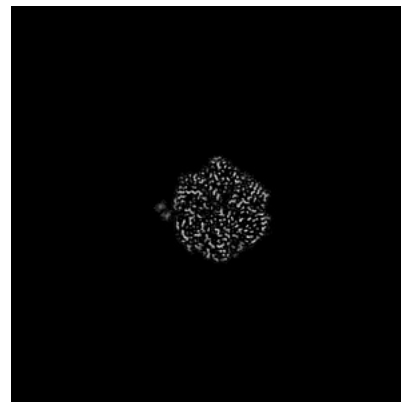
6.3.1 Primary map



X Index: 258



Y Index: 237



Z Index: 310

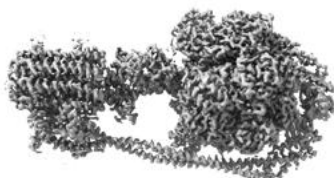
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal surface views [i](#)

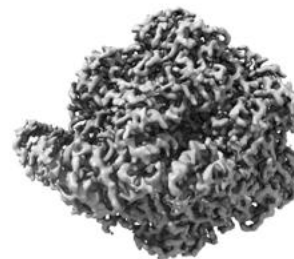
6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.0157. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

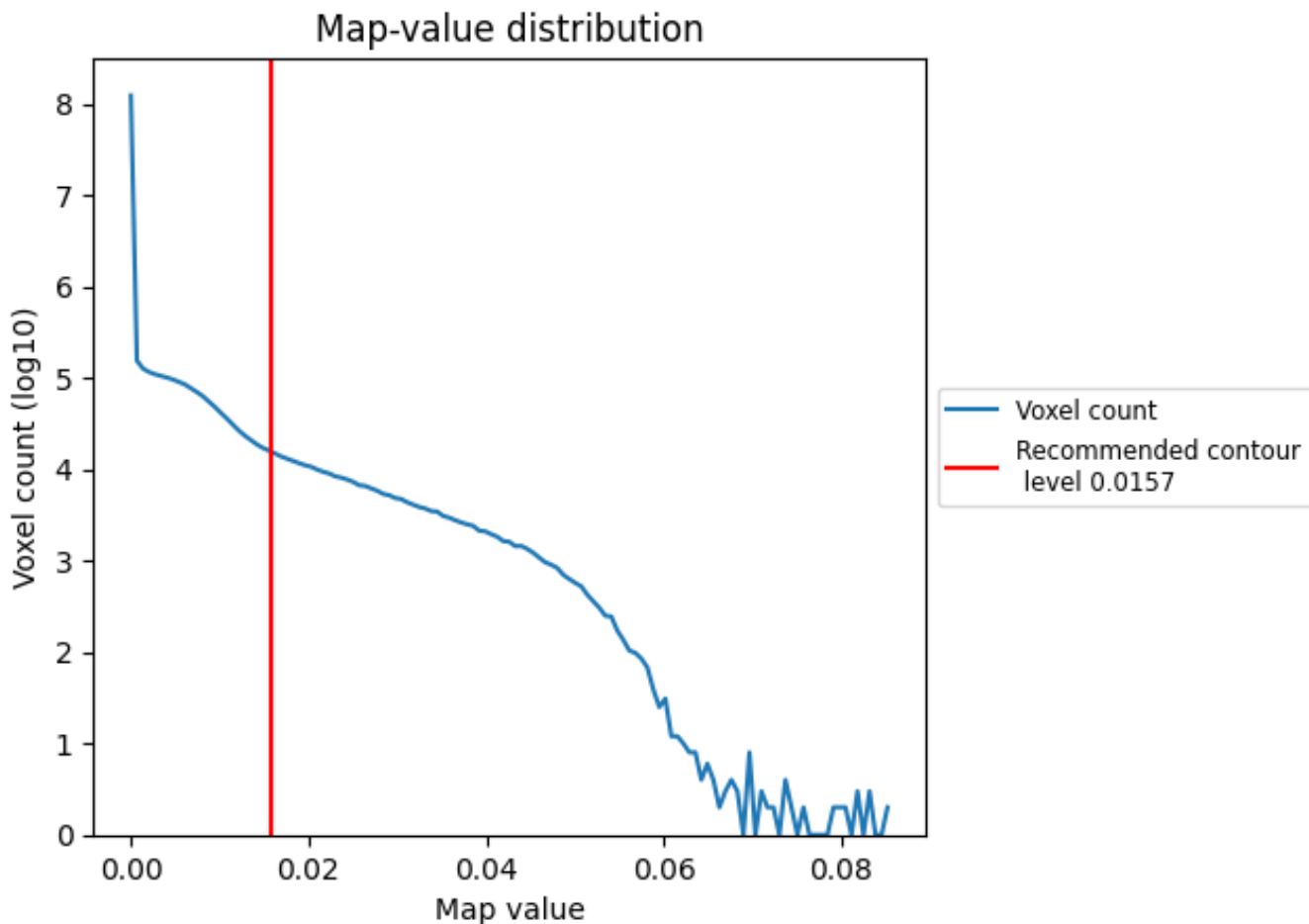
6.5 Mask visualisation

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

7 Map analysis [i](#)

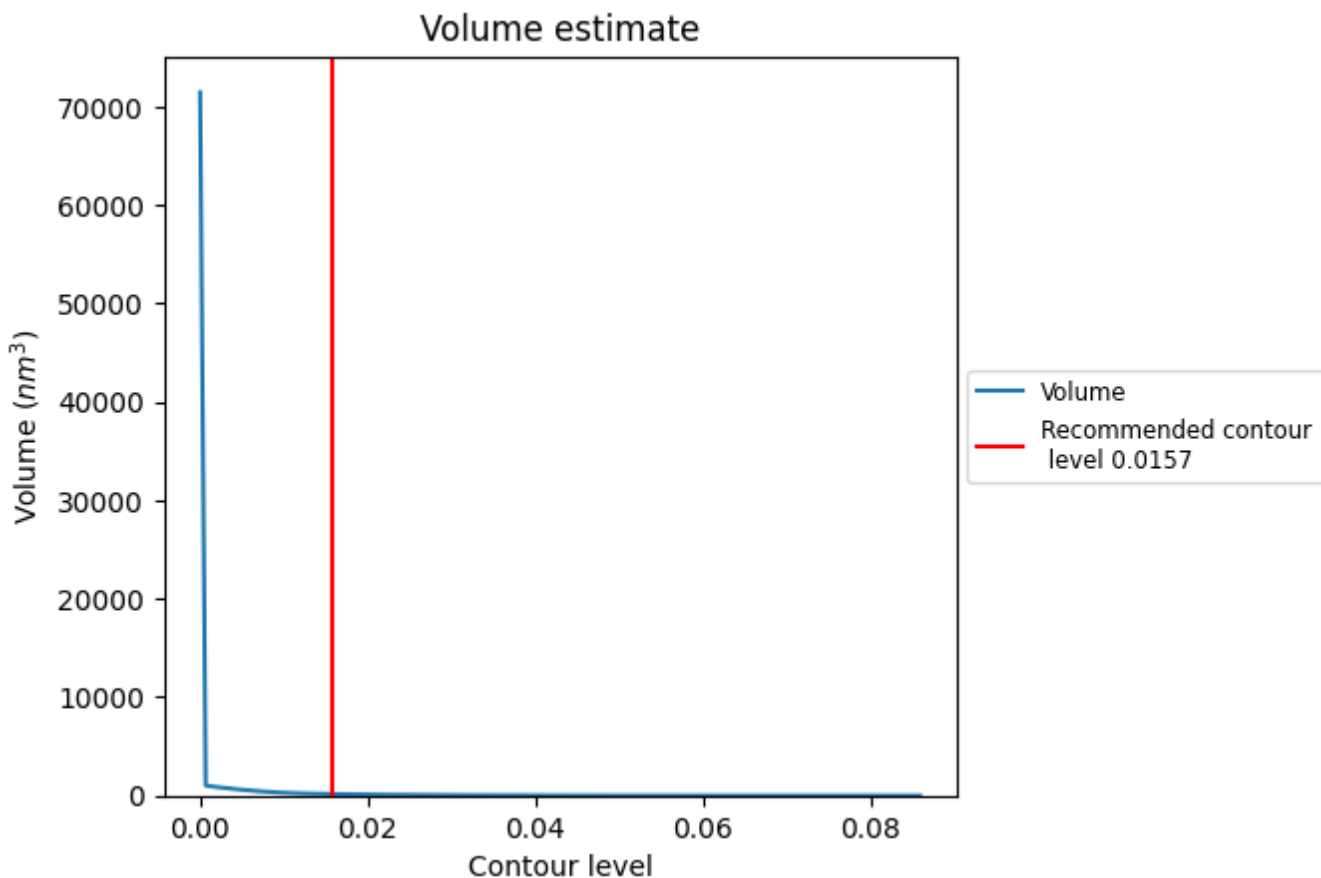
This section contains the results of statistical analysis of the map.

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.

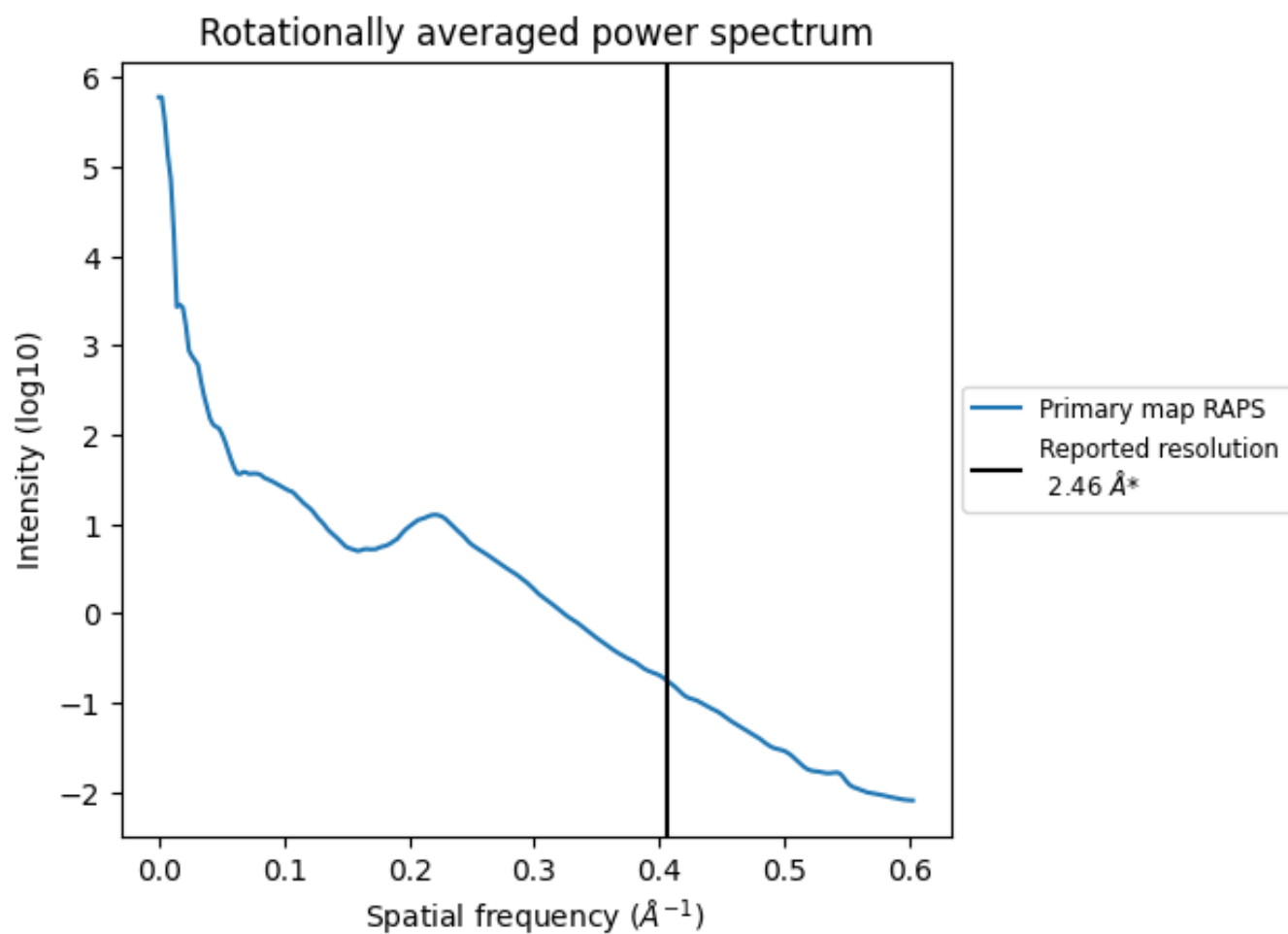
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 155 nm^3 ; this corresponds to an approximate mass of 140 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 0.407 Å⁻¹

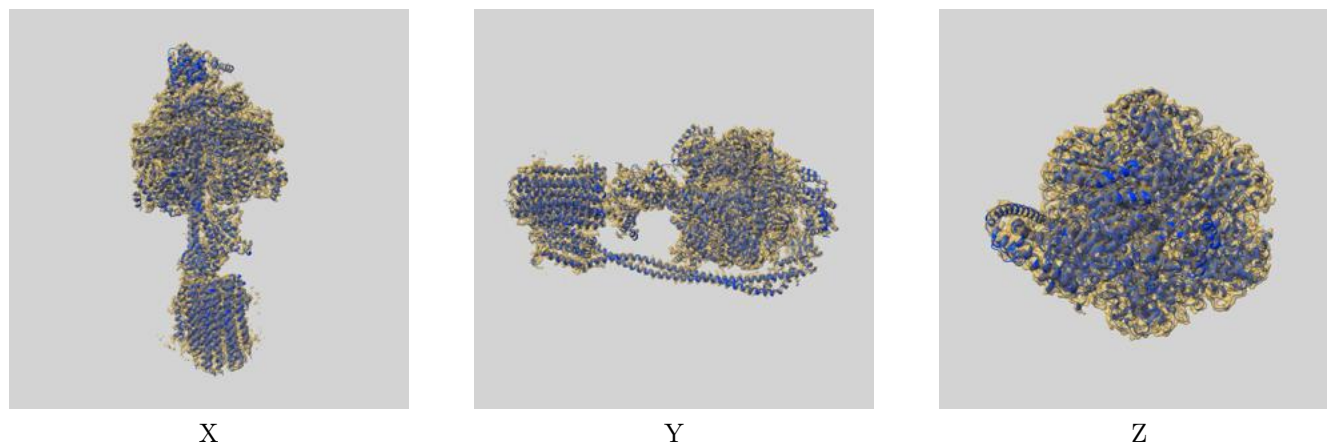
8 Fourier-Shell correlation

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

9 Map-model fit [i](#)

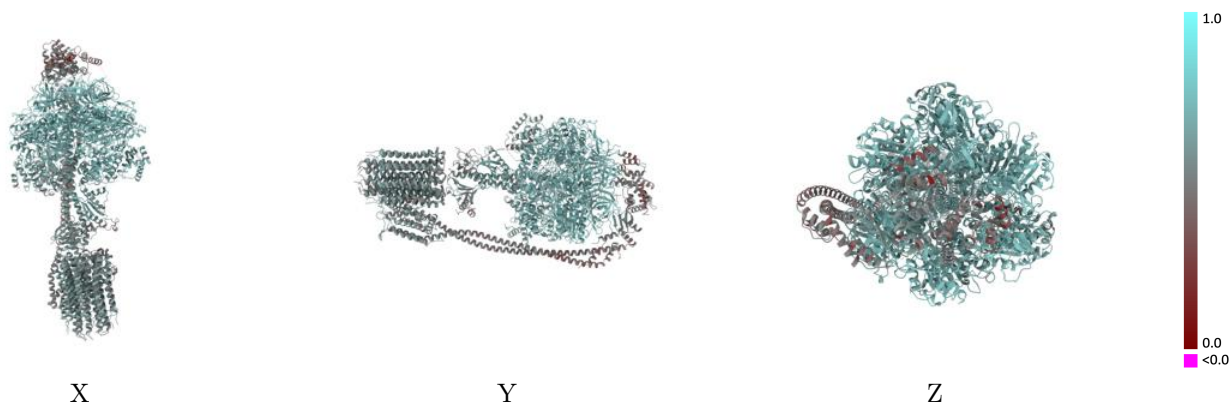
This section contains information regarding the fit between EMDB map EMD-12417 and PDB model 7NJS. Per-residue inclusion information can be found in section 3 on page 9.

9.1 Map-model overlay [i](#)



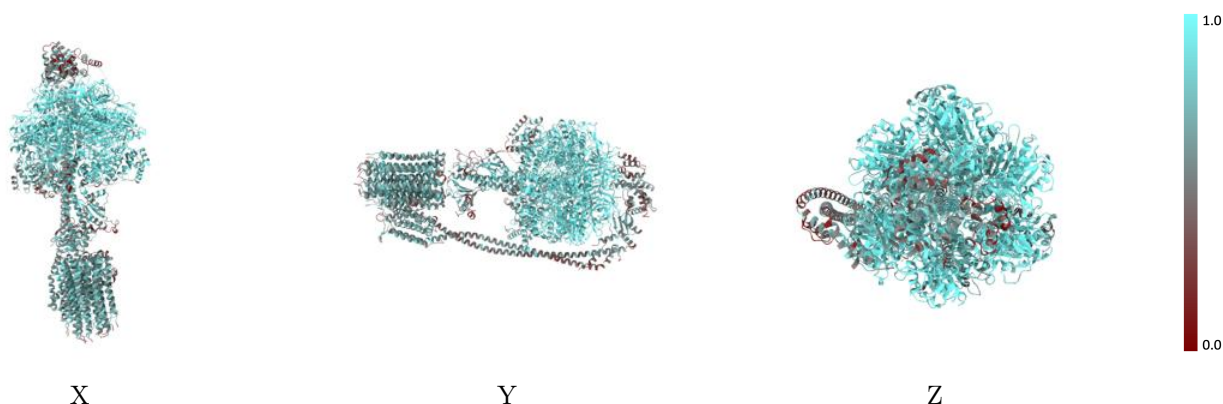
The images above show the 3D surface view of the map at the recommended contour level 0.0157 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



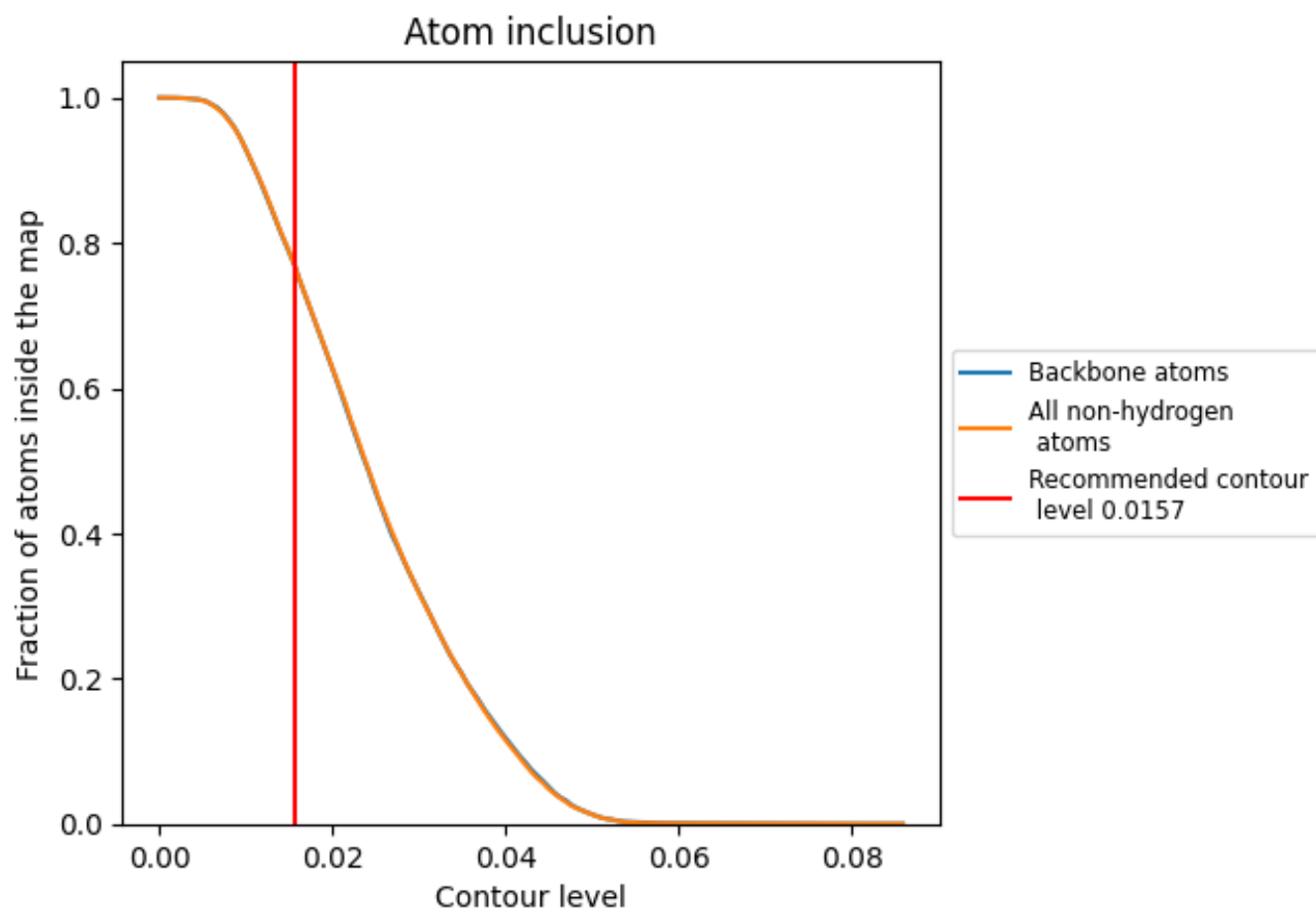
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.0157).











































9.4 Atom inclusion [i](#)



At the recommended contour level, 77% 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 (0.0157) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7662	 0.6140
A	 0.8696	 0.6690
B	 0.8174	 0.6460
C	 0.8590	 0.6620
D	 0.9074	 0.6830
E	 0.8404	 0.6630
F	 0.9126	 0.6860
G	 0.7169	 0.5980
H	 0.5840	 0.5290
L	 0.6901	 0.5550
M	 0.6644	 0.5530
N	 0.6473	 0.5400
O	 0.6301	 0.5450
P	 0.6455	 0.5460
Q	 0.6421	 0.5410
R	 0.6507	 0.5610
S	 0.6747	 0.5570
T	 0.7061	 0.5630
a	 0.5927	 0.5350
b	 0.5281	 0.4670
d	 0.5393	 0.4750

