wwPDB EM Validation Summary Report ⓘ

Mar 2, 2024 – 03:55 PM EST

PDB ID	:	5T4Q
EMDB ID	:	EMD-8359
Title	:	Autoinhibited E. coli ATP synthase state 3
Authors	:	Sobti, M.; Smits, C.; Wong, A.S.W.; Ishmukhametov, R.; Stock, D.; Sandin, S.; Stewart, A.G.
Deposited on	:	2016-08-29
Resolution	:	8.53 Å(reported)

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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 8.53 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.

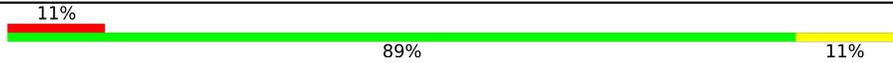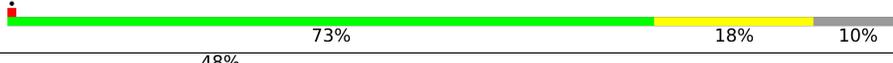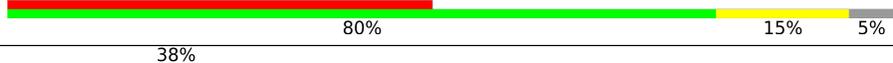| Metric	Percentile Ranks	Value
Clashscore		7
Ramachandran outliers		3.6%

Worse   *Better*

▮ Percentile relative to all structures

◻ Percentile relative to all EM structures
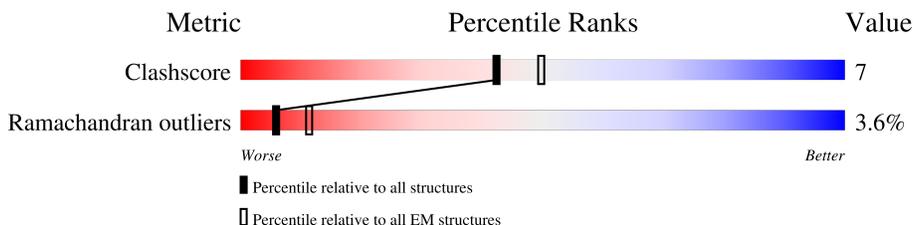
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023

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	• 88% 12%
1	B	513	• 90% 10% •
1	C	513	• 88% 11% •
2	D	471	• 87% 12% •
2	E	471	15% 86% 13% •
2	F	471	5% 86% 13% •
3	G	287	5% 85% 13% •
4	H	139	9% 85% 13% •
5	I	155	11% 92% 8%

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Mol	Chain	Length	Quality of chain
5	J	155	11% — 89% / 11%
6	K	271	26% — 64% / 13% / 22%
7	L	177	73% / 18% / 10%
8	M	79	48% — 80% / 15% / 5%
8	N	79	38% — 81% / 14% / 5%
8	O	79	53% — 85% / 10% / 5%
8	P	79	47% — 85% / 10% / 5%
8	Q	79	48% — 82% / 13% / 5%
8	R	79	41% — 78% / 16% / 5%
8	S	79	43% — 78% / 16% / 5%
8	T	79	42% — 78% / 16% / 5%
8	U	79	44% — 81% / 14% / 5%
8	V	79	43% — 78% / 16% / 5%

2   Entry composition ⓘ

There are 10 unique types of molecules in this entry. The entry contains 23568 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	511	Total 2507	C 1485	N 511	O 511	0	0
1	B	510	Total 2502	C 1482	N 510	O 510	0	0
1	C	508	Total 2492	C 1476	N 508	O 508	0	0

There are 15 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	47	ALA	CYS	conflict	UNP B7MGF4
A	90	ALA	CYS	conflict	UNP B7MGF4
A	193	ALA	CYS	conflict	UNP B7MGF4
A	243	ALA	CYS	conflict	UNP B7MGF4
A	419	ASN	LYS	conflict	UNP B7MGF4
B	47	ALA	CYS	conflict	UNP B7MGF4
B	90	ALA	CYS	conflict	UNP B7MGF4
B	193	ALA	CYS	conflict	UNP B7MGF4
B	243	ALA	CYS	conflict	UNP B7MGF4
B	419	ASN	LYS	conflict	UNP B7MGF4
C	47	ALA	CYS	conflict	UNP B7MGF4
C	90	ALA	CYS	conflict	UNP B7MGF4
C	193	ALA	CYS	conflict	UNP B7MGF4
C	243	ALA	CYS	conflict	UNP B7MGF4
C	419	ASN	LYS	conflict	UNP B7MGF4

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

Mol	Chain	Residues	Atoms				AltConf	Trace
2	D	466	Total 2284	C 1352	N 466	O 466	0	0
2	E	466	Total 2284	C 1352	N 466	O 466	0	0

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W O R L D W I D E
wwPDB
PROTEIN DATA BANK

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Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
2	F	466	2284	1352	466	466	0	0

There are 36 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	-11	MET	-	expression tag	UNP B7MGF2
D	-10	ARG	-	expression tag	UNP B7MGF2
D	-9	GLY	-	expression tag	UNP B7MGF2
D	-8	SER	-	expression tag	UNP B7MGF2
D	-7	HIS	-	expression tag	UNP B7MGF2
D	-6	HIS	-	expression tag	UNP B7MGF2
D	-5	HIS	-	expression tag	UNP B7MGF2
D	-4	HIS	-	expression tag	UNP B7MGF2
D	-3	HIS	-	expression tag	UNP B7MGF2
D	-2	HIS	-	expression tag	UNP B7MGF2
D	-1	GLY	-	expression tag	UNP B7MGF2
D	137	ALA	CYS	conflict	UNP B7MGF2
E	-11	MET	-	expression tag	UNP B7MGF2
E	-10	ARG	-	expression tag	UNP B7MGF2
E	-9	GLY	-	expression tag	UNP B7MGF2
E	-8	SER	-	expression tag	UNP B7MGF2
E	-7	HIS	-	expression tag	UNP B7MGF2
E	-6	HIS	-	expression tag	UNP B7MGF2
E	-5	HIS	-	expression tag	UNP B7MGF2
E	-4	HIS	-	expression tag	UNP B7MGF2
E	-3	HIS	-	expression tag	UNP B7MGF2
E	-2	HIS	-	expression tag	UNP B7MGF2
E	-1	GLY	-	expression tag	UNP B7MGF2
E	137	ALA	CYS	conflict	UNP B7MGF2
F	-11	MET	-	expression tag	UNP B7MGF2
F	-10	ARG	-	expression tag	UNP B7MGF2
F	-9	GLY	-	expression tag	UNP B7MGF2
F	-8	SER	-	expression tag	UNP B7MGF2
F	-7	HIS	-	expression tag	UNP B7MGF2
F	-6	HIS	-	expression tag	UNP B7MGF2
F	-5	HIS	-	expression tag	UNP B7MGF2
F	-4	HIS	-	expression tag	UNP B7MGF2
F	-3	HIS	-	expression tag	UNP B7MGF2
F	-2	HIS	-	expression tag	UNP B7MGF2
F	-1	GLY	-	expression tag	UNP B7MGF2
F	137	ALA	CYS	conflict	UNP B7MGF2

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

Mol	Chain	Residues	Atoms				AltConf	Trace
3	G	284	Total 1400	C 832	N 284	O 284	0	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
G	5	ASP	GLU	conflict	UNP B7MGF3
G	87	ALA	CYS	conflict	UNP B7MGF3
G	112	ALA	CYS	conflict	UNP B7MGF3

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

Mol	Chain	Residues	Atoms				AltConf	Trace
4	H	136	Total 668	C 396	N 136	O 136	0	0

• Molecule 5 is a protein called ATP synthase subunit b.

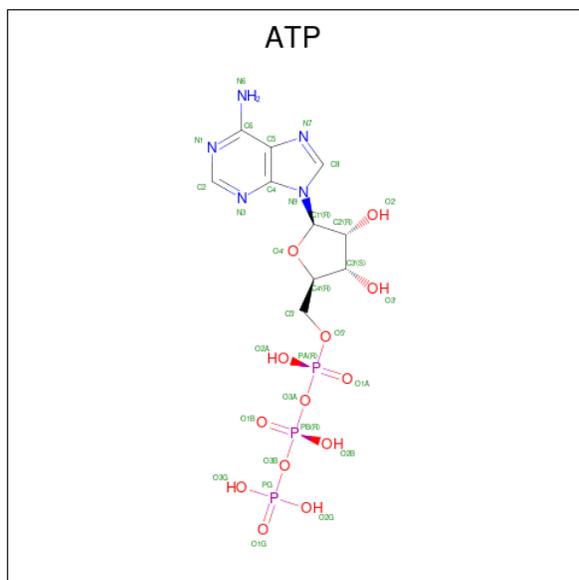| Mol	Chain	Residues	Atoms				AltConf	Trace
5	I	155	Total 772	C 462	N 155	O 155	0	0
5	J	155	Total 772	C 462	N 155	O 155	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
I	21	ALA	CYS	conflict	UNP P0ABA2
J	21	ALA	CYS	conflict	UNP P0ABA2

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

Mol	Chain	Residues	Atoms				AltConf	Trace
6	K	211	Total 1040	C 618	N 211	O 211	0	0

• Molecule 7 is a protein called ATP synthase subunit delta.

Mol	Chain	Residues	Atoms				AltConf	Trace
7	L	160	Total 793	C 473	N 160	O 160	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
L	64	ALA	CYS	conflict	UNP B7MGF5
L	140	ALA	CYS	conflict	UNP B7MGF5

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

Mol	Chain	Residues	Atoms				AltConf	Trace
8	M	75	Total 365	C 215	N 75	O 75	0	0
8	N	75	Total 365	C 215	N 75	O 75	0	0
8	O	75	Total 365	C 215	N 75	O 75	0	0
8	P	75	Total 365	C 215	N 75	O 75	0	0
8	Q	75	Total 365	C 215	N 75	O 75	0	0
8	R	75	Total 365	C 215	N 75	O 75	0	0
8	S	75	Total 365	C 215	N 75	O 75	0	0
8	T	75	Total 365	C 215	N 75	O 75	0	0
8	U	75	Total 365	C 215	N 75	O 75	0	0
8	V	75	Total 365	C 215	N 75	O 75	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
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	

- Molecule 10 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).
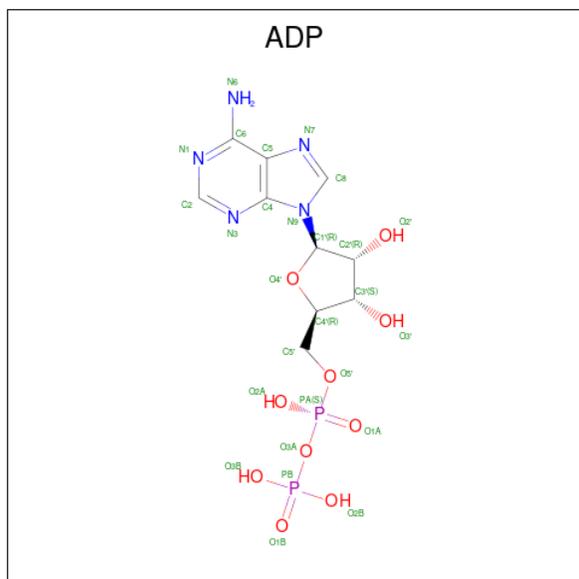
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
10	D	1	27	10	5	10	2	0

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
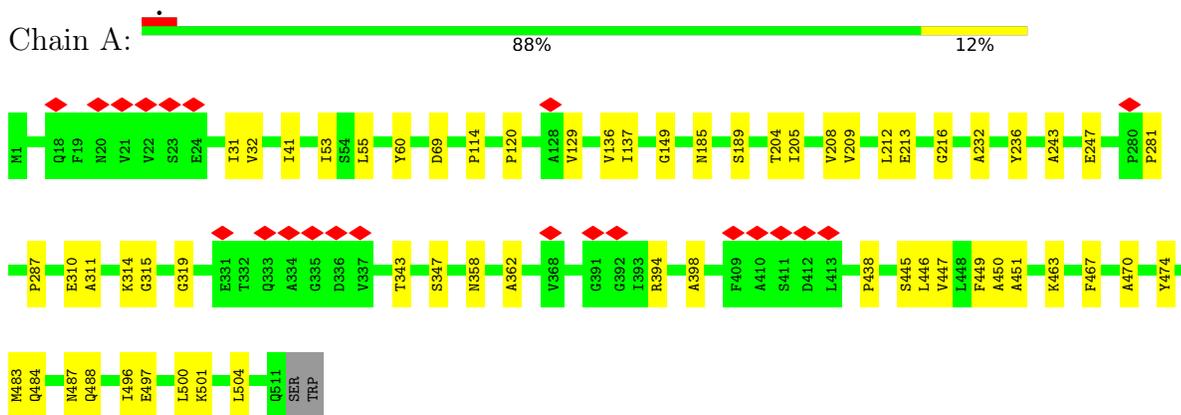
Chain A:

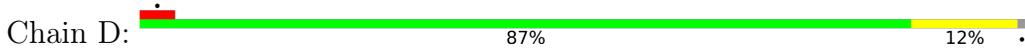

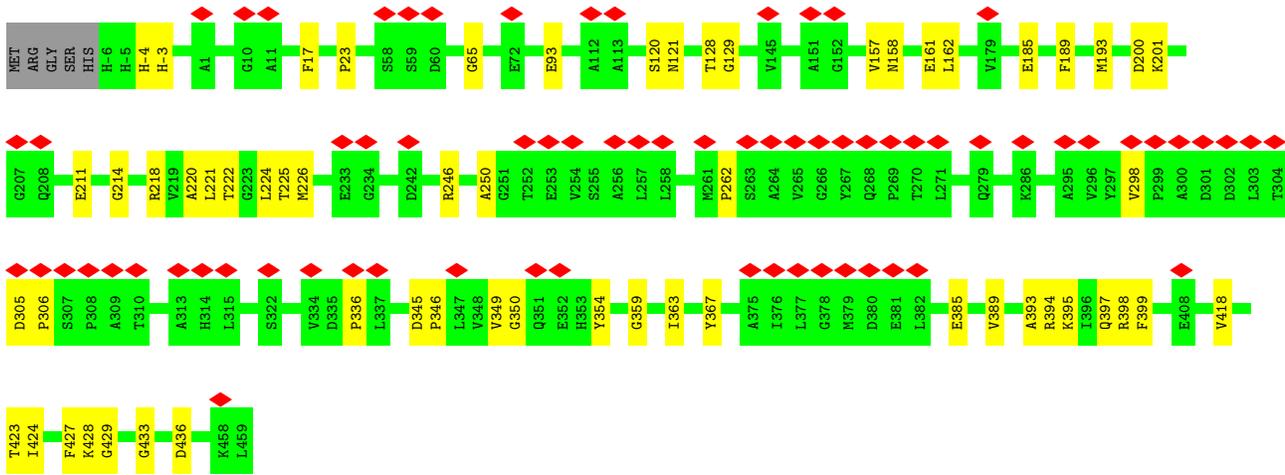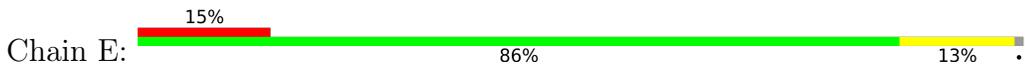- Molecule 1: ATP synthase subunit alpha
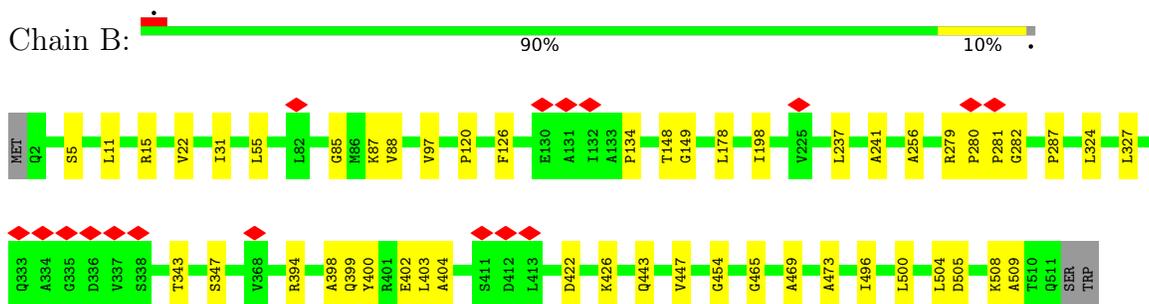
Chain B:

- Molecule 1: ATP synthase subunit alpha
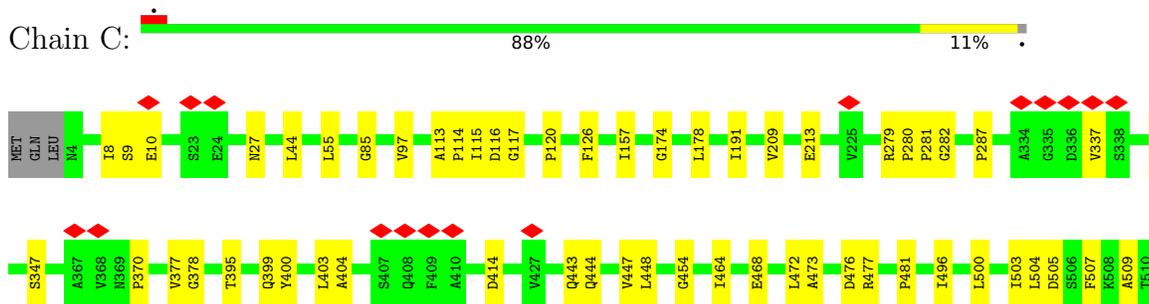
Chain C:

Q511 SER TRP

• Molecule 2: ATP synthase subunit beta

Chain D:

87% 12%

MET ARG GLY SER HIS H-6 H-5 H-4 H-3 M0 G10 F17 P18 E30 N33 V42 T53 G57 S58 S59 G65 D70 P74 V77 P78 V90 L91 G92 E93 A113 V132 M136 A137 P138 V153 I163 A167 V175 E192

S196 P212 G223 A227 R231 D242 R246 A250 P262 V265 A272 V277 R281 A295 L303 T304 D305 P308 F312 L321 S322 Y331 P332 A333 V334 D335 P336 L337 D338 S339 D345 P346 V349 K371 A375 M379

D380 E381 F404 F405 V406 A407 G412 S413 P439 A452 A456 L459

• Molecule 2: ATP synthase subunit beta

Chain E:

15% 86% 13%

MET ARG GLY SER HIS H-6 H-5 H-4 H-3 A1 G10 A11 F17 P23 S58 S59 D60 G65 E72 E93 A112 A113 S120 N121 T128 G129 V145 A151 G152 V157 N158 E161 L162 V179 E185 F189 M193 D200 K201

G207 Q208 E211 G214 R218 V219 A220 L221 T222 G223 L224 T225 M226 E233 G234 D242 R246 A250 G251 T252 E253 V254 S255 A256 L257 L258 M261 P262 S263 A264 V265 G266 Y267 Q268 P269 T270 L271 Q279 K286 A295 V296 Y297 V298 P299 A300 D301 D302 L303 T304

D305 P306 S307 P308 A309 T310 A313 H314 L315 S322 V334 D335 P336 L337 D345 P346 L347 V348 V349 G350 Q351 E352 H353 Y354 G359 I363 Y367 A375 I376 L377 G378 M379 D380 E381 L382 E385 V389 A393 R394 K395 I396 Q397 R398 F399 E408 V418

T423 I424 F427 K428 G429 G433 D436 K458 L459

• Molecule 2: ATP synthase subunit beta

Chain F:

5% 86% 13%

MET ARG GLY SER HIS H-6 H-3 V6 Q7 V8 A11 F17 P23 G57 S58 S59 D60 L71 P78 V79 G85 E93 P94 A113 P114 E117 S120 L125 A140 G149 G150 A151 V157 N158 E161 L162 G178 Y206 P212

P213 L221 T222 G223 L224 T225 M226 A227 L238 D242 R246 A250 G251 T252 S255 A256 G259 P262 V265 A272 E273 E274 M275 L278 Q279 T285 T291 V296 Y297 V298 P299 A300 D301 T304 D305 P306 A309 T310 A313 H314 L321

V334 D335 P336 D345 V349 I363 Y367 D380 E385 V389 P414 G433 P439 L459

• Molecule 3: ATP synthase gamma chain

Chain G:

• Molecule 4: ATP synthase epsilon chain

Chain H:

• Molecule 5: ATP synthase subunit b

Chain I:

• Molecule 5: ATP synthase subunit b
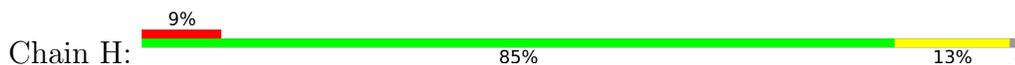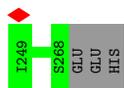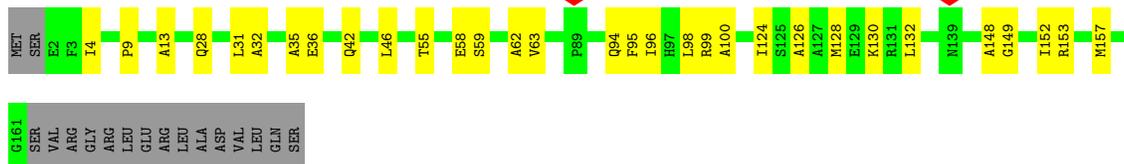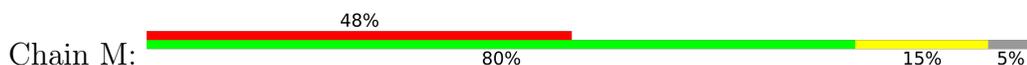
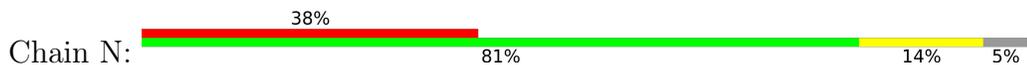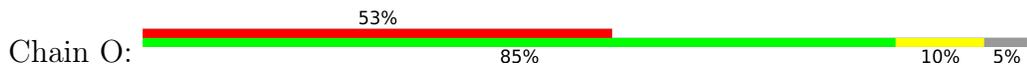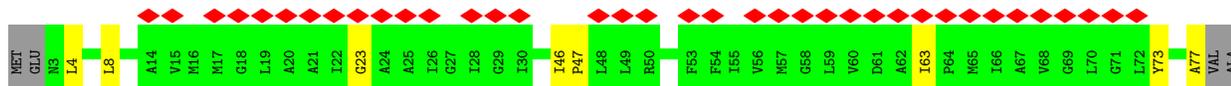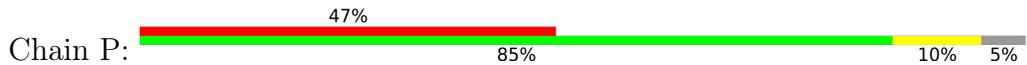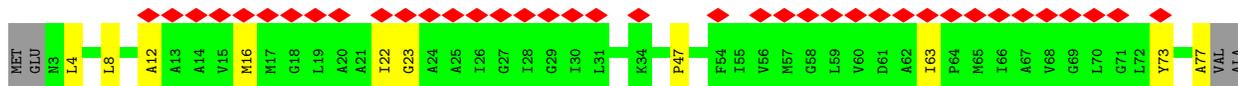Chain J:

• Molecule 6: ATP synthase subunit a

Chain K:

I249 S268 GLU GLU HIS

• Molecule 7: ATP synthase subunit delta

Chain L:

73%   18%   10%

MET SER E2 F3 I4 P9 A13 Q28 L31 A32 A35 E36 Q42 L46 T55 E58 S59 A62 V63 P89 Q94 F95 I96 H97 L98 R99 A100 I124 S125 A126 A127 M128 E129 K130 R131 L132 N139 A148 G149 I152 R153 M157

G161 SER VAL ARG GLY ARG LEU GLU ARG LEU ALA ASP VAL LEU GLN SER

• Molecule 8: ATP synthase subunit c

Chain M:

48%

80%   15%   5%

MET GLU N3 L4 L8 A12 A13 A14 V15 M16 M17 G18 L19 A20 A21 I22 G23 A24 A25 I26 G27 I28 G29 I30 L31 F35 L36 E37 G38 A39 P47 L48 L49 Q52 F53 F54 I55 V56 M57 G58 L59 V60 D61 A62 I63 P64 M65 I66 A67 V68 G69 L70 G71 L72 Y73

A77 VAL ALA

• Molecule 8: ATP synthase subunit c

Chain N:

38%

81%   14%   5%

MET GLU N3 L4 L8 M11 A14 V15 M16 M17 G18 L19 A20 A21 I22 G23 A24 A25 I26 I30 F35 A39 P43 D44 P47 L48 L49 F53 F54 I55 V56 M57 G58 L59 V60 D61 A62 I63 P64 M65 I66 Y73 A77 VAL ALA

• Molecule 8: ATP synthase subunit c

Chain O:

53%

85%   10%   5%

MET GLU N3 L4 L8 M11 A12 A13 A14 V15 G18 L19 A20 A21 I22 G23 A24 A25 I26 G27 I28 G29 I30 L31 G32 E37 I46 P47 L48 L49 R50 F53 F54 I55 V56 M57 G58 L59 V60 D61 A62 I63 P64 M65 I66 A67 V68 G69 L70 G71 L72 Y73 V74 M75

F76 A77 VAL ALA

• Molecule 8: ATP synthase subunit c

Chain P:

47%

85%   10%   5%

MET GLU N3 L4 L8 A14 V15 M16 M17 G18 L19 A20 A21 I22 G23 A24 A25 I26 G27 I28 G29 I30 I46 P47 L48 L49 R50 F53 F54 I55 V56 M57 G58 L59 V60 D61 A62 I63 P64 M65 I66 A67 V68 G69 L70 G71 L72 Y73 A77 VAL ALA

• Molecule 8: ATP synthase subunit c

Chain Q:

48%

82%   13%   5%

MET GLU N3 L4 L8 A12 A13 A14 V15 M16 M17 G18 L19 A20 A21 I22 G23 A24 A25 I26 G27 I28 G29 I30 L31 K34 P47 F54 I55 V56 M57 G58 L59 V60 D61 A62 I63 P64 M65 I66 A67 V68 G69 L70 G71 L72 Y73 A77 VAL ALA

• Molecule 8: ATP synthase subunit c

Chain R:

41%

78%   16%   5%

MET GLU N3 L4 L8 M11 A12 A13 A14 V15 M16 M17 G18 L19 A20 A21 I22 G23 A24 A25 I26 F35 A39 P43 D44 P47 F53 F54 I55 V56 M57 G58 L59 V60 D61 A62 I63 P64 M65 I66 A67 V68 G69 L70 Y73 A77 VAL ALA

• Molecule 8: ATP synthase subunit c

Chain S:

43%

78%   16%   5%

MET GLU N3 L4 L8 M11 A12 A13 A14 V15 M16 L19 A20 A21 I22 G23 A24 A25 I26 G27 I28 G29 I30 L31 F35 A39 P43 D44 P47 V56 M57 G58 L59 V60 D61 A62 I63 P64 M65 I66 A67 V68 G69 L70 G71 L72 Y73 A77 VAL ALA

• Molecule 8: ATP synthase subunit c

Chain T:

42%

78%   16%   5%

MET GLU N3 L4 L8 A12 A13 A14 V15 M16 L19 A20 A21 I22 G23 A24 A25 I26 G27 I28 G29 I30 F35 L36 E37 G38 A39 A40 R41 Q42 P43 D44 P47 V56 M57 G58 L59 V60 D61 A62 I63 P64 M65 I66 A67 V68 G69 L70 Y73 A77 VAL ALA

• Molecule 8: ATP synthase subunit c

Chain U:

44%

81%   14%   5%

MET GLU N3 L4 L8 A13 A14 V15 M16 M17 G18 L19 A20 A21 I22 G23 A24 A25 I26 G27 I28 G29 I30 F35 L36 E37 G38 A39 P43 D44 P47 V56 M57 G58 L59 V60 D61 A62 I63 P64 M65 I66 A67 V68 G69 L70 Y73 A77 VAL ALA

• Molecule 8: ATP synthase subunit c

Chain V:

43%

78%   16%   5%

MET GLU N3 L4 L8 M11 A12 A13 A14 V15 M16 M17 G18 L19 A20 A21 I22 G23 A24 A25 I26 F35 L36 E37 G38 A39 A40 R41 Q42 P43 D44 P47 L48 L49 F54 I55 V56 M57 G58 L59 V60 D61 A62 I63 P64 M65 I66 A67 V68 G69 L70 Y73 A77

VAL ALA

4   Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	95345	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 $(e^-/\text{Å}^2)$	29	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	FEI FALCON II (4k x 4k)	Depositor
Maximum map value	0.105	Depositor
Minimum map value	-0.026	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.009	Depositor
Recommended contour level	0.048	Depositor
Map size (Å)	350.0, 350.0, 350.0	wwPDB
Map dimensions	250, 250, 250	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.4, 1.4, 1.4	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: 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	0/2506	0.43	0/3478
1	B	0.25	0/2501	0.43	0/3471
1	C	0.24	0/2491	0.43	0/3457
2	D	0.24	0/2283	0.42	0/3167
2	E	0.24	0/2283	0.43	0/3167
2	F	0.25	0/2283	0.45	0/3167
3	G	0.23	0/1399	0.39	0/1945
4	H	0.27	0/667	0.45	0/925
5	I	0.23	0/771	0.33	0/1076
5	J	0.23	0/771	0.34	0/1076
6	K	0.23	0/1038	0.41	0/1441
7	L	0.23	0/792	0.39	0/1103
8	M	0.23	0/364	0.34	0/502
8	N	0.24	0/364	0.34	0/502
8	O	0.23	0/364	0.33	0/502
8	P	0.23	0/364	0.34	0/502
8	Q	0.24	0/364	0.34	0/502
8	R	0.23	0/364	0.34	0/502
8	S	0.24	0/364	0.34	0/502
8	T	0.23	0/364	0.34	0/502
8	U	0.24	0/364	0.34	0/502
8	V	0.23	0/364	0.34	0/502
All	All	0.24	0/23425	0.41	0/32493

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 ⓘ

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	2507	0	1240	23	0
1	B	2502	0	1235	20	0
1	C	2492	0	1231	20	0
2	D	2284	0	1065	16	0
2	E	2284	0	1065	24	0
2	F	2284	0	1065	23	0
3	G	1400	0	665	17	0
4	H	668	0	330	8	0
5	I	772	0	406	9	0
5	J	772	0	406	11	0
6	K	1040	0	464	18	0
7	L	793	0	407	17	0
8	M	365	0	192	7	0
8	N	365	0	192	5	0
8	O	365	0	192	3	0
8	P	365	0	192	3	0
8	Q	365	0	192	5	0
8	R	365	0	192	6	0
8	S	365	0	192	6	0
8	T	365	0	192	7	0
8	U	365	0	192	5	0
8	V	365	0	192	7	0
9	A	31	0	12	0	0
9	B	31	0	12	0	0
9	C	31	0	12	0	0
10	D	27	0	12	0	0
All	All	23568	0	11547	251	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 7.

The worst 5 of 251 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)
2:E:128:THR:H	2:E:129:GLY:HA2	1.55	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:L:58:GLU:O	7:L:62:ALA:HB3	1.91	0.71
1:C:97:VAL:O	1:C:126:PHE:HA	1.91	0.71
1:A:53:ILE:O	1:A:60:TYR:HA	1.91	0.71
5:J:124:VAL:O	5:J:128:ALA:HB3	1.94	0.68

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	509/513 (99%)	395 (78%)	98 (19%)	16 (3%)	4	27
1	B	508/513 (99%)	396 (78%)	94 (18%)	18 (4%)	3	25
1	C	506/513 (99%)	392 (78%)	93 (18%)	21 (4%)	3	22
2	D	464/471 (98%)	365 (79%)	73 (16%)	26 (6%)	2	19
2	E	464/471 (98%)	358 (77%)	90 (19%)	16 (3%)	3	26
2	F	464/471 (98%)	367 (79%)	77 (17%)	20 (4%)	2	22
3	G	282/287 (98%)	240 (85%)	34 (12%)	8 (3%)	5	30
4	H	134/139 (96%)	108 (81%)	21 (16%)	5 (4%)	3	24
5	I	153/155 (99%)	147 (96%)	6 (4%)	0	100	100
5	J	153/155 (99%)	146 (95%)	7 (5%)	0	100	100
6	K	207/271 (76%)	175 (84%)	22 (11%)	10 (5%)	2	21
7	L	158/177 (89%)	130 (82%)	26 (16%)	2 (1%)	12	48
8	M	73/79 (92%)	66 (90%)	5 (7%)	2 (3%)	5	31
8	N	73/79 (92%)	66 (90%)	4 (6%)	3 (4%)	3	23
8	O	73/79 (92%)	66 (90%)	4 (6%)	3 (4%)	3	23
8	P	73/79 (92%)	65 (89%)	5 (7%)	3 (4%)	3	23

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
8	Q	73/79 (92%)	65 (89%)	6 (8%)	2 (3%)	5	31
8	R	73/79 (92%)	66 (90%)	4 (6%)	3 (4%)	3	23
8	S	73/79 (92%)	66 (90%)	4 (6%)	3 (4%)	3	23
8	T	73/79 (92%)	66 (90%)	4 (6%)	3 (4%)	3	23
8	U	73/79 (92%)	66 (90%)	4 (6%)	3 (4%)	3	23
8	V	73/79 (92%)	66 (90%)	4 (6%)	3 (4%)	3	23
All	All	4732/4926 (96%)	3877 (82%)	685 (14%)	170 (4%)	6	25

5 of 170 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	55	LEU
1	A	120	PRO
1	A	281	PRO
1	B	55	LEU
1	B	279	ARG

5.3.2 Protein sidechains ⓘ

There are no protein residues with a non-rotameric sidechain to report in this entry.

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 ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

4 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#|Z| > 2$	Counts	RMSZ	$\#|Z| > 2$
9	ATP	C	601	-	26,33,33	0.94	1 (3%)	31,52,52	1.56	5 (16%)
9	ATP	A	601	-	26,33,33	0.93	1 (3%)	31,52,52	1.57	5 (16%)
10	ADP	D	601	-	24,29,29	0.96	1 (4%)	29,45,45	1.41	4 (13%)
9	ATP	B	601	-	26,33,33	0.93	1 (3%)	31,52,52	1.57	5 (16%)

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	601	-	-	1/18/38/38	0/3/3/3
9	ATP	A	601	-	-	1/18/38/38	0/3/3/3
10	ADP	D	601	-	-	3/12/32/32	0/3/3/3
9	ATP	B	601	-	-	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	A	601	ATP	C5-C4	2.51	1.47	1.40
9	B	601	ATP	C5-C4	2.51	1.47	1.40
9	C	601	ATP	C5-C4	2.51	1.47	1.40
10	D	601	ADP	C5-C4	2.49	1.47	1.40

The worst 5 of 19 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
9	C	601	ATP	PA-O3A-PB	-3.59	120.50	132.83
9	A	601	ATP	PA-O3A-PB	-3.59	120.50	132.83
9	B	601	ATP	PA-O3A-PB	-3.57	120.56	132.83
9	A	601	ATP	PB-O3B-PG	-3.49	120.84	132.83
9	C	601	ATP	PB-O3B-PG	-3.48	120.87	132.83

There are no chirality outliers.

5 of 6 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
10	D	601	ADP	PB-O3A-PA-O1A
10	D	601	ADP	PB-O3A-PA-O2A
10	D	601	ADP	O4'-C4'-C5'-O5'
9	A	601	ATP	C5'-O5'-PA-O1A
9	B	601	ATP	C5'-O5'-PA-O1A

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 601

Bond lengths

Bond angles

Torsions

Rings

Ligand ATP A 601

Bond lengths

Bond angles

Torsions

Rings

Ligand ADP D 601

Bond lengths

Bond angles

Torsions

Rings

Ligand ATP B 601

Bond lengths

Bond angles

Torsions

Rings
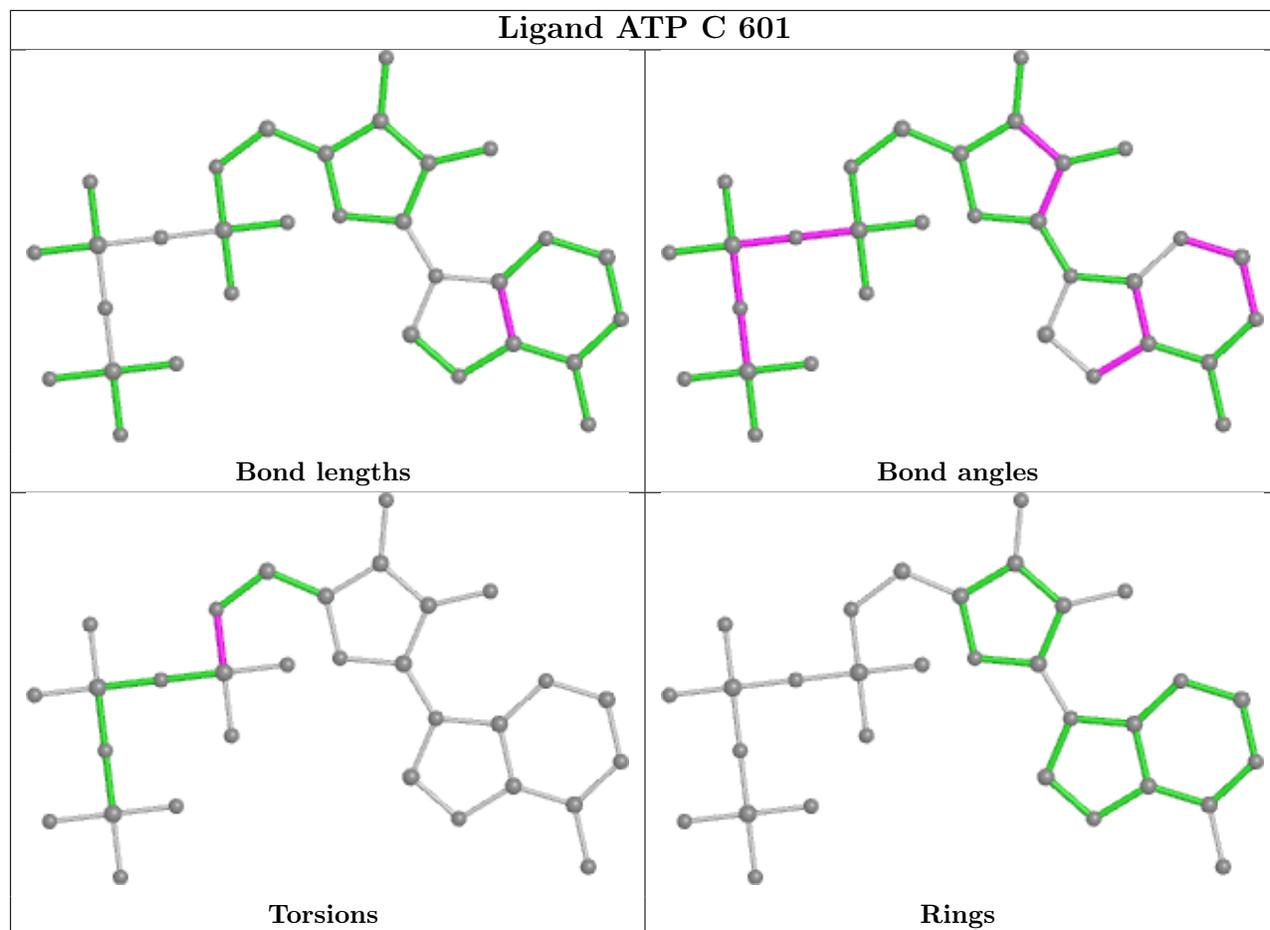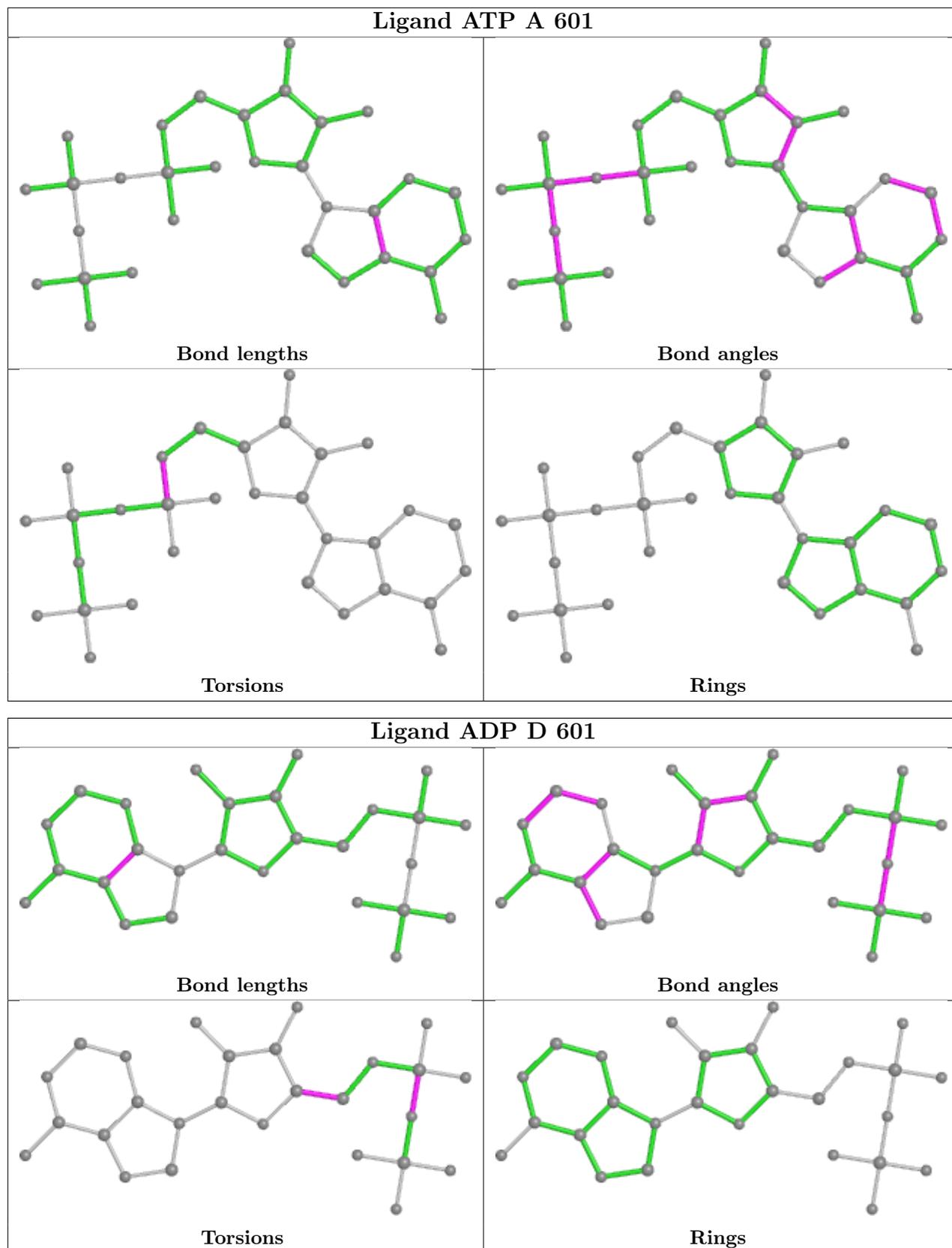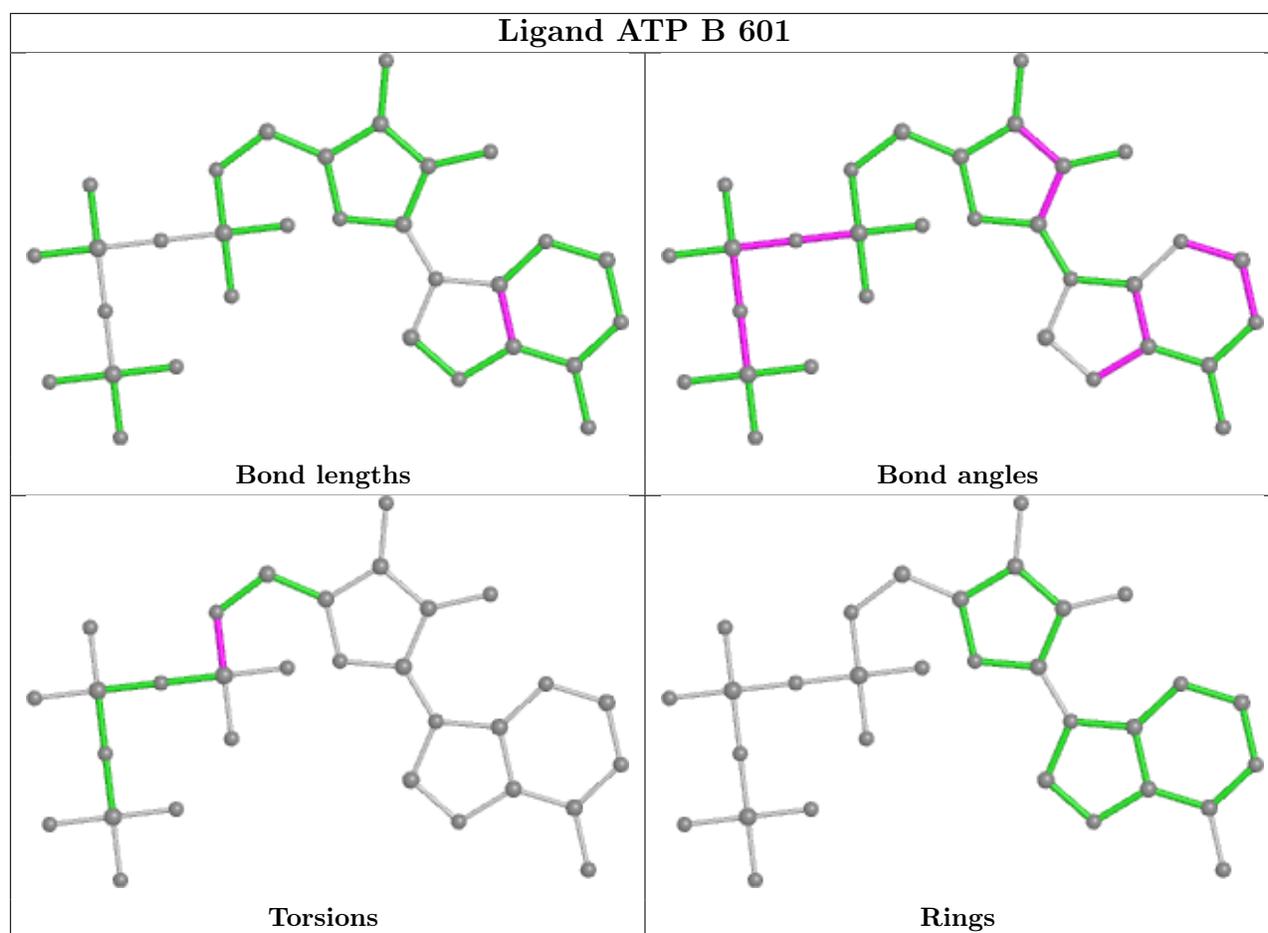
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-8359. 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 ⓘ

6.1.1 Primary map

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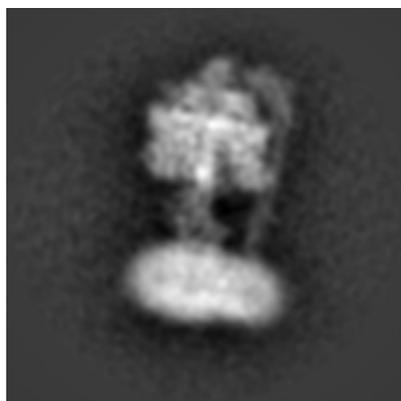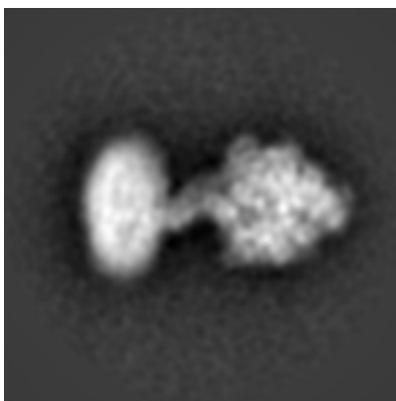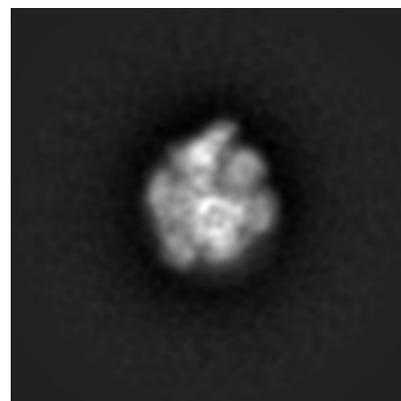
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ
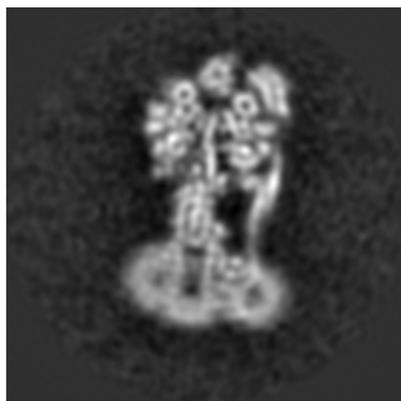
6.2.1 Primary map
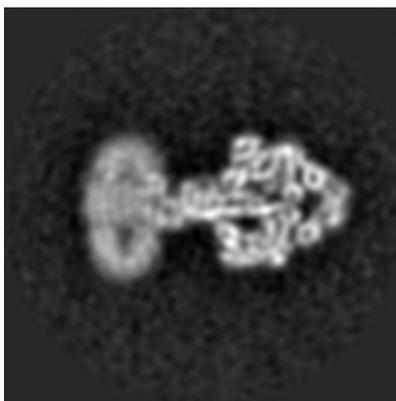
| X Index: 125 | Y Index: 125 | Z Index: 125 |
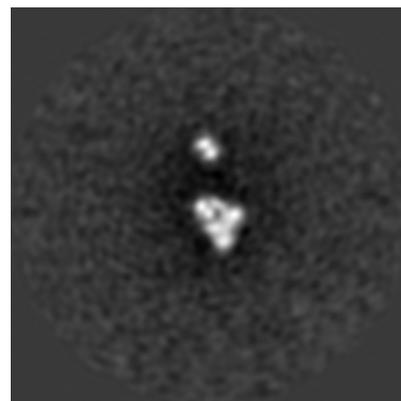
The images above show central slices of the map in three orthogonal directions.

6.3　Largest variance slices　ⓘ
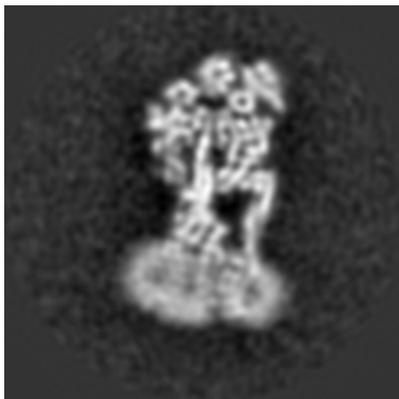
6.3.1　Primary map
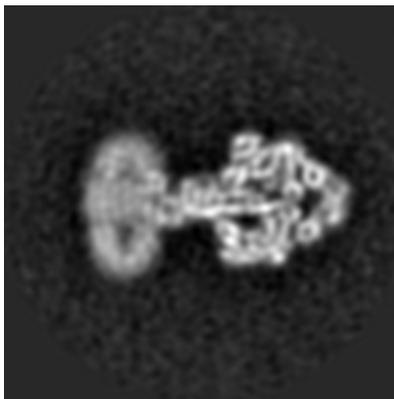
| X Index: 121 | Y Index: 125 | Z Index: 174 |
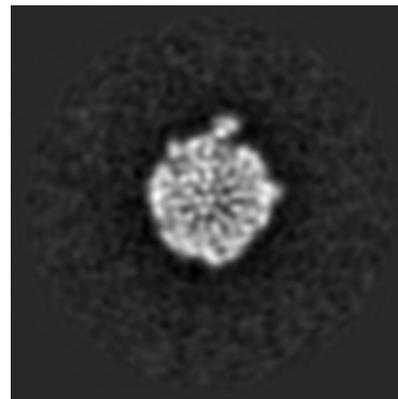
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1　Primary map

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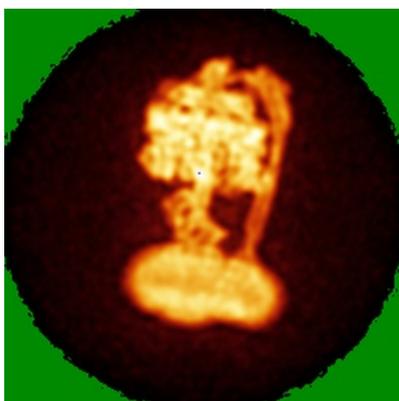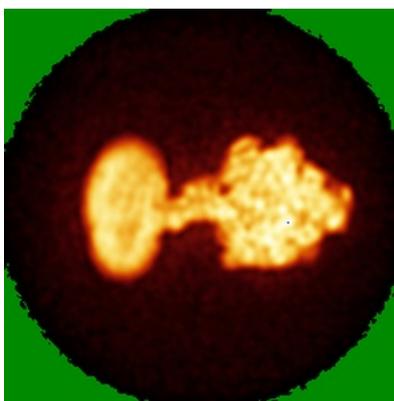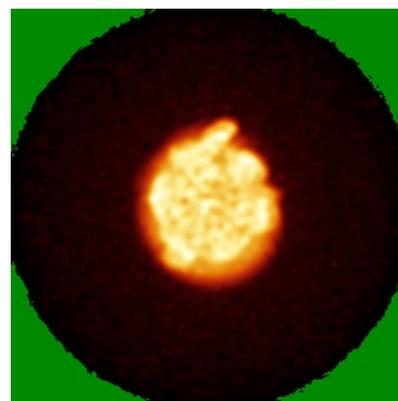
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5   Orthogonal surface views   ⓘ

6.5.1   Primary map

X   Y   Z
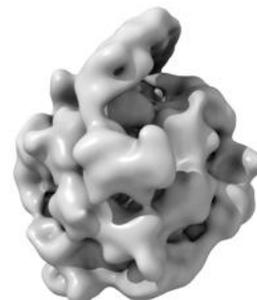
The images above show the 3D surface view of the map at the recommended contour level 0.048. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

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 (i)
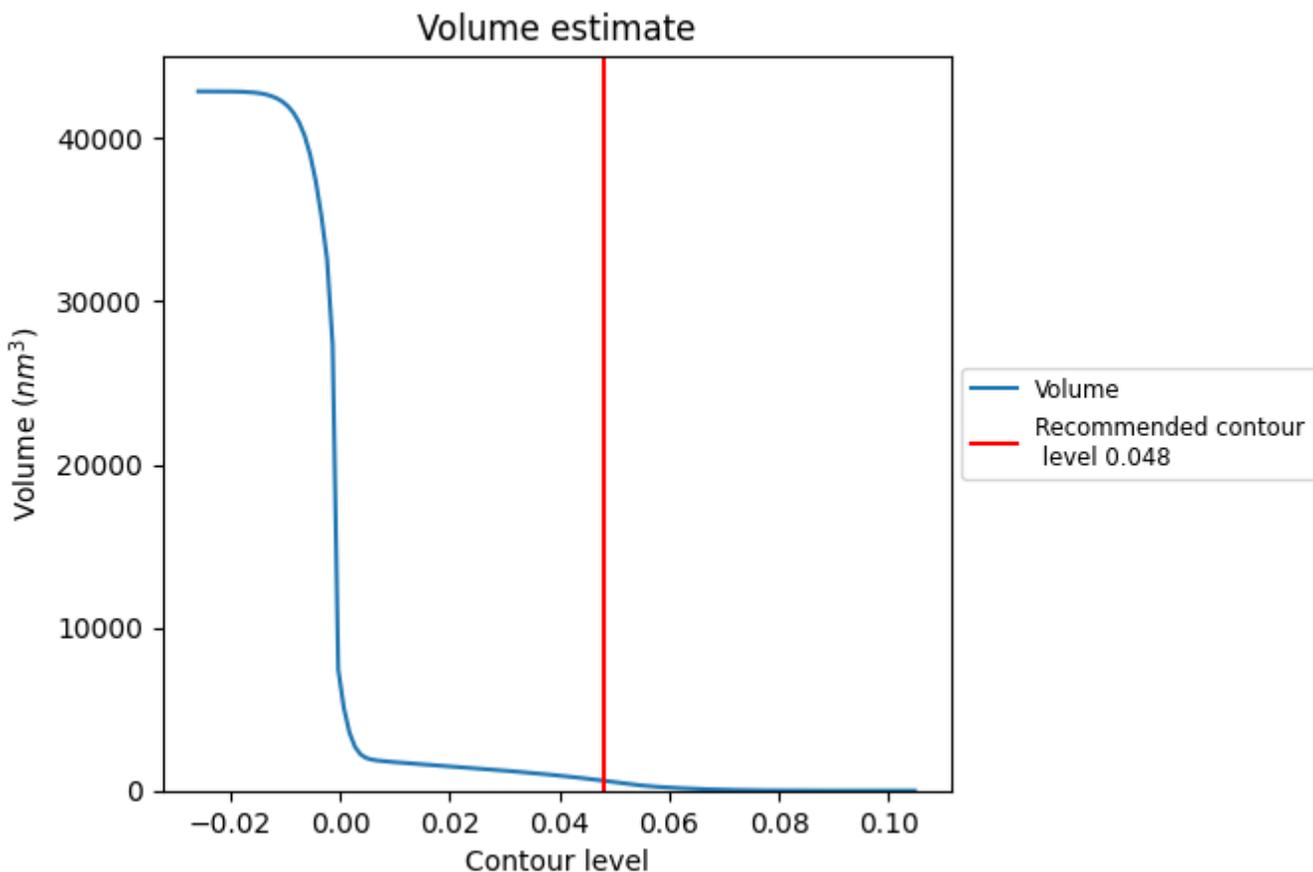
The volume at the recommended contour level is 612 nm^3; this corresponds to an approximate mass of 553 kDa.

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 ⓘ
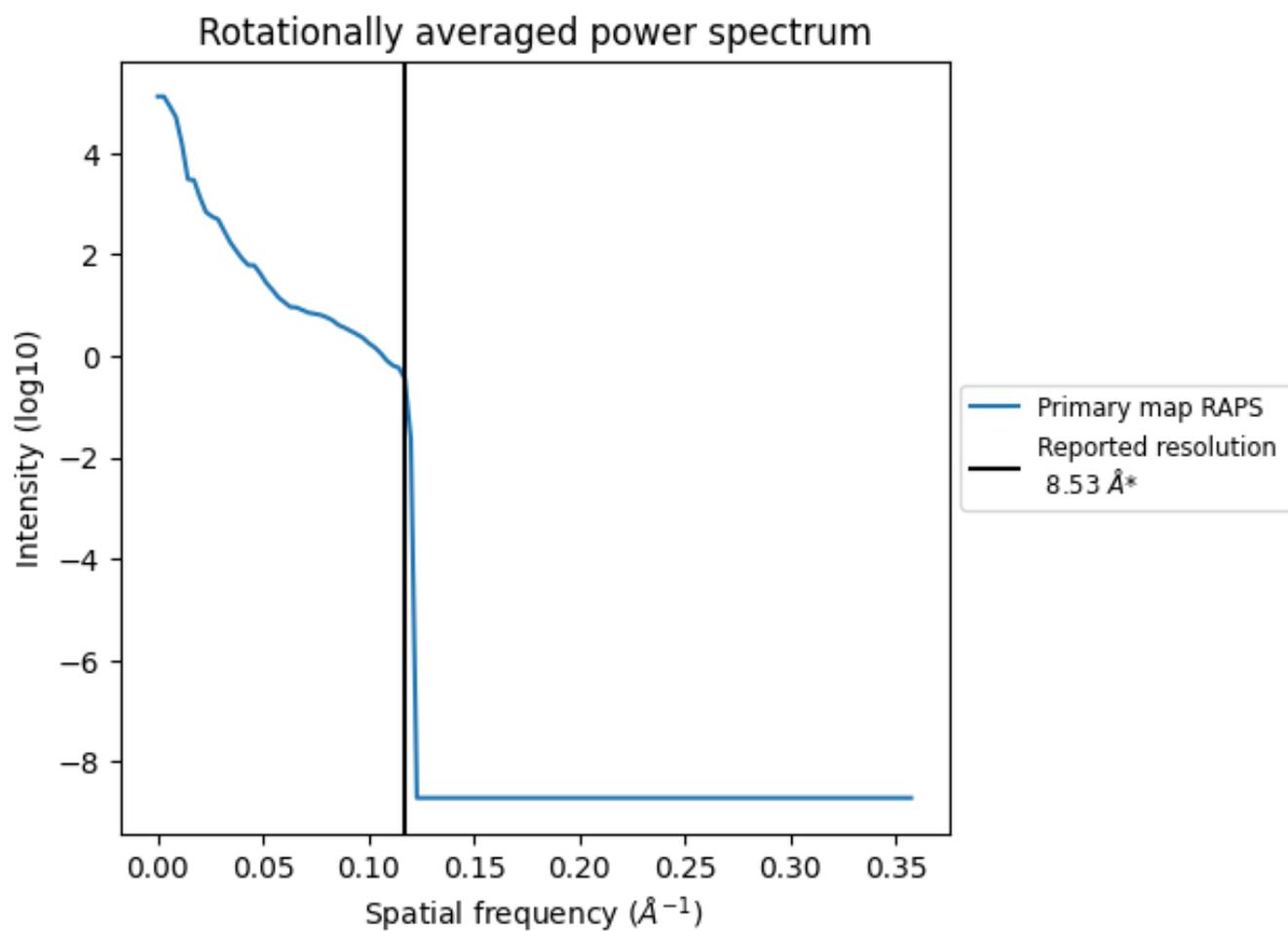
*Reported resolution corresponds to spatial frequency of 0.117 Å^{-1}

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 ⓘ
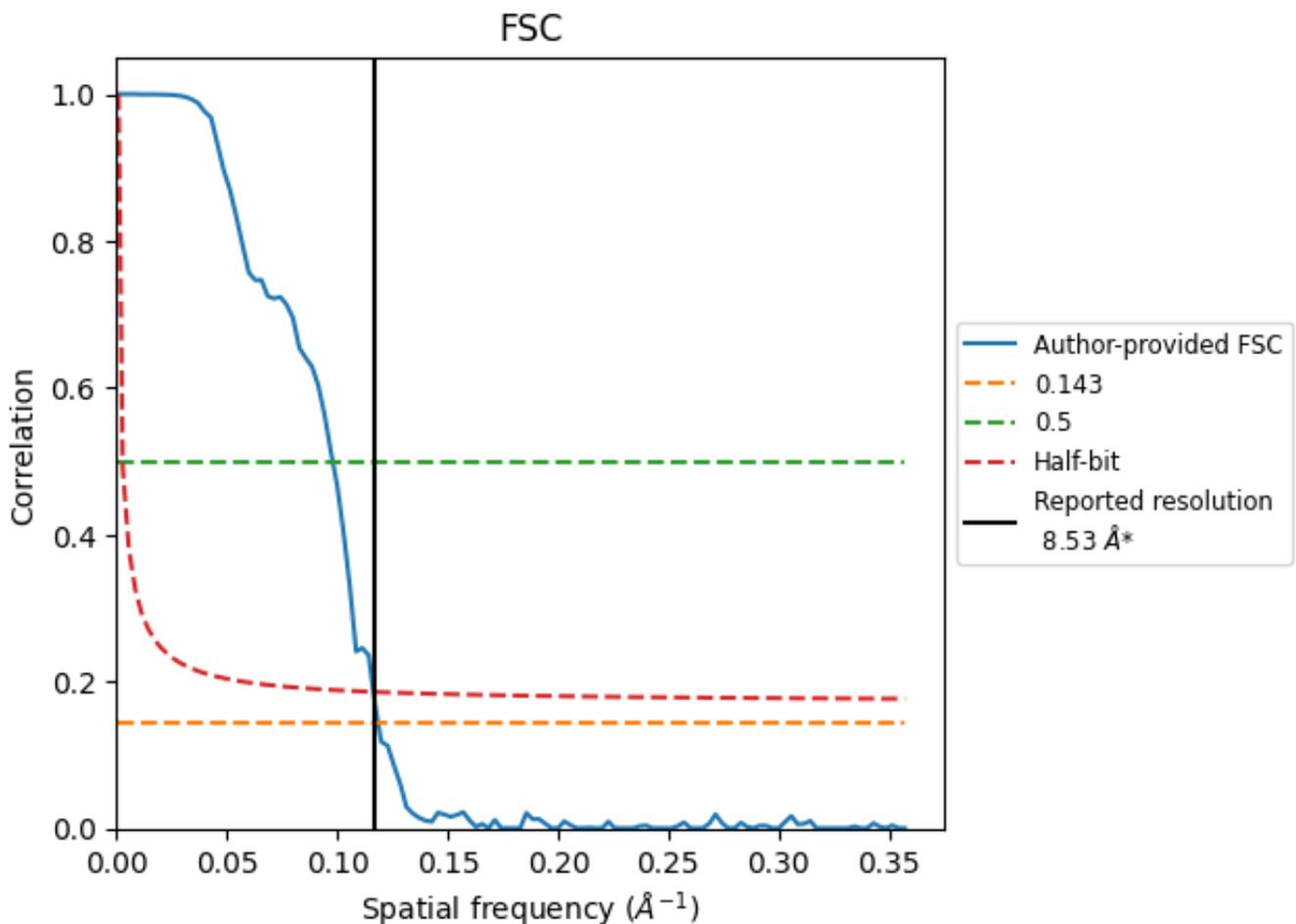
*Reported resolution corresponds to spatial frequency of 0.117 Å^{-1}

8.2 Resolution estimates (i)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	8.53	-	-
Author-provided FSC curve	8.43	10.20	8.59
Unmasked-calculated*	-	-	-

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

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-8359 and PDB model 5T4Q. Per-residue inclusion information can be found in section 3 on page 10.

9.1 Map-model overlay ⓘ

X   Y   Z
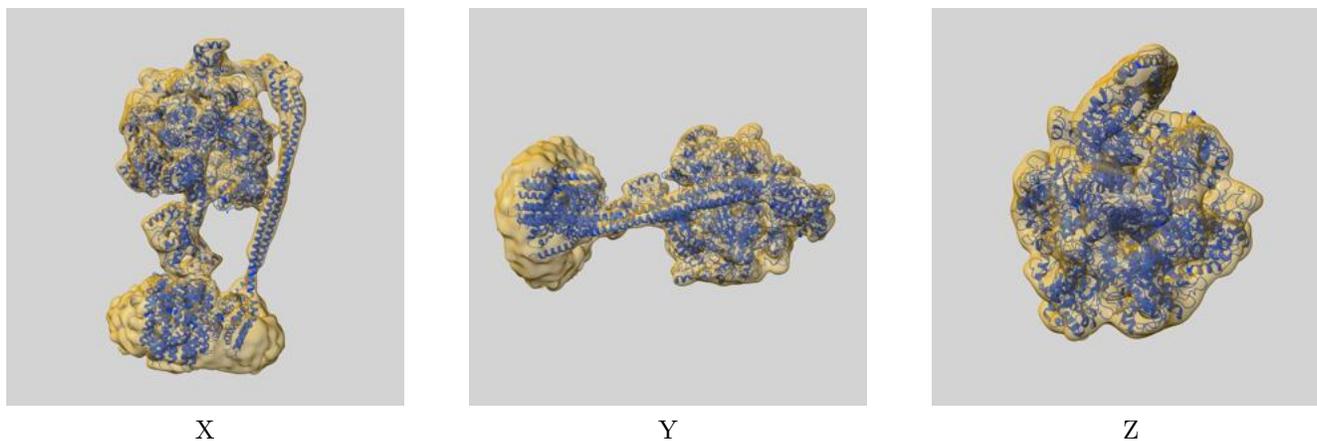
The images above show the 3D surface view of the map at the recommended contour level 0.048 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2   Q-score mapped to coordinate model ⓘ

X   Y   Z
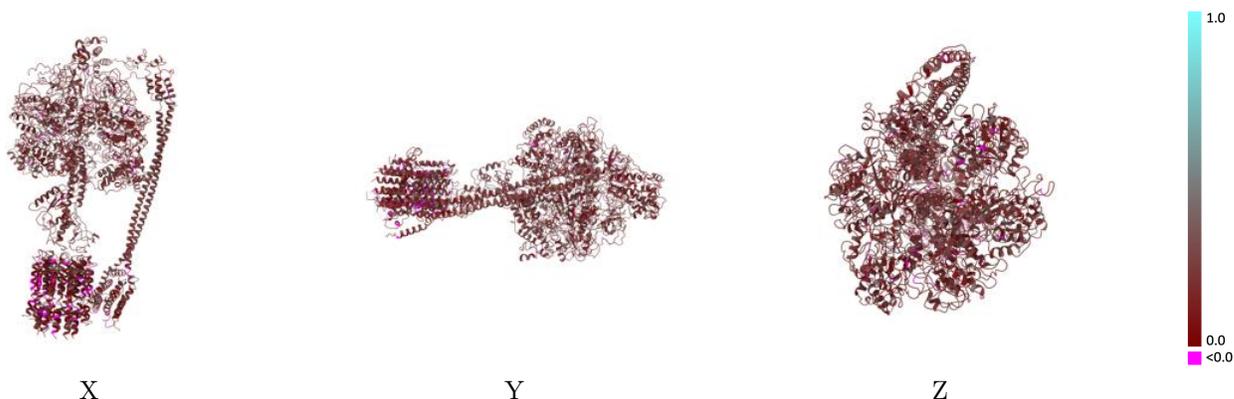
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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
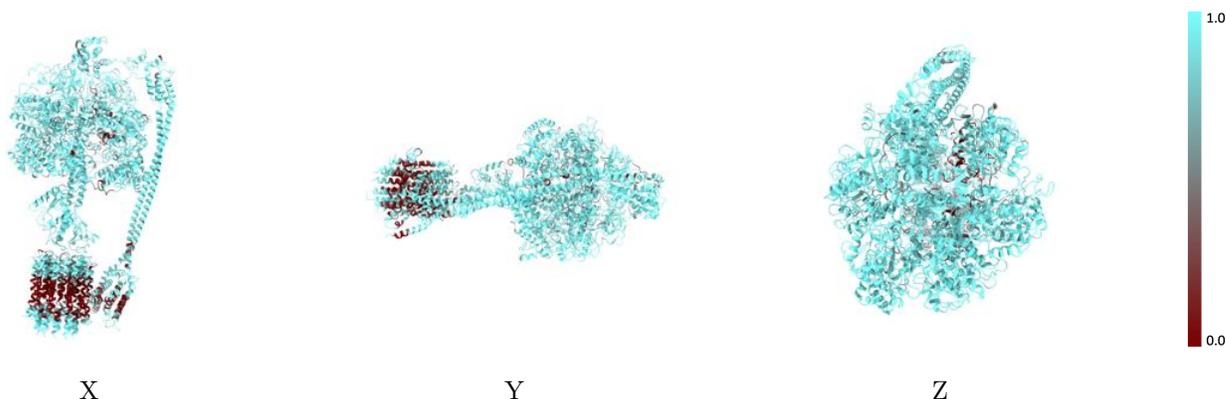
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.048).

9.4 Atom inclusion ⓘ
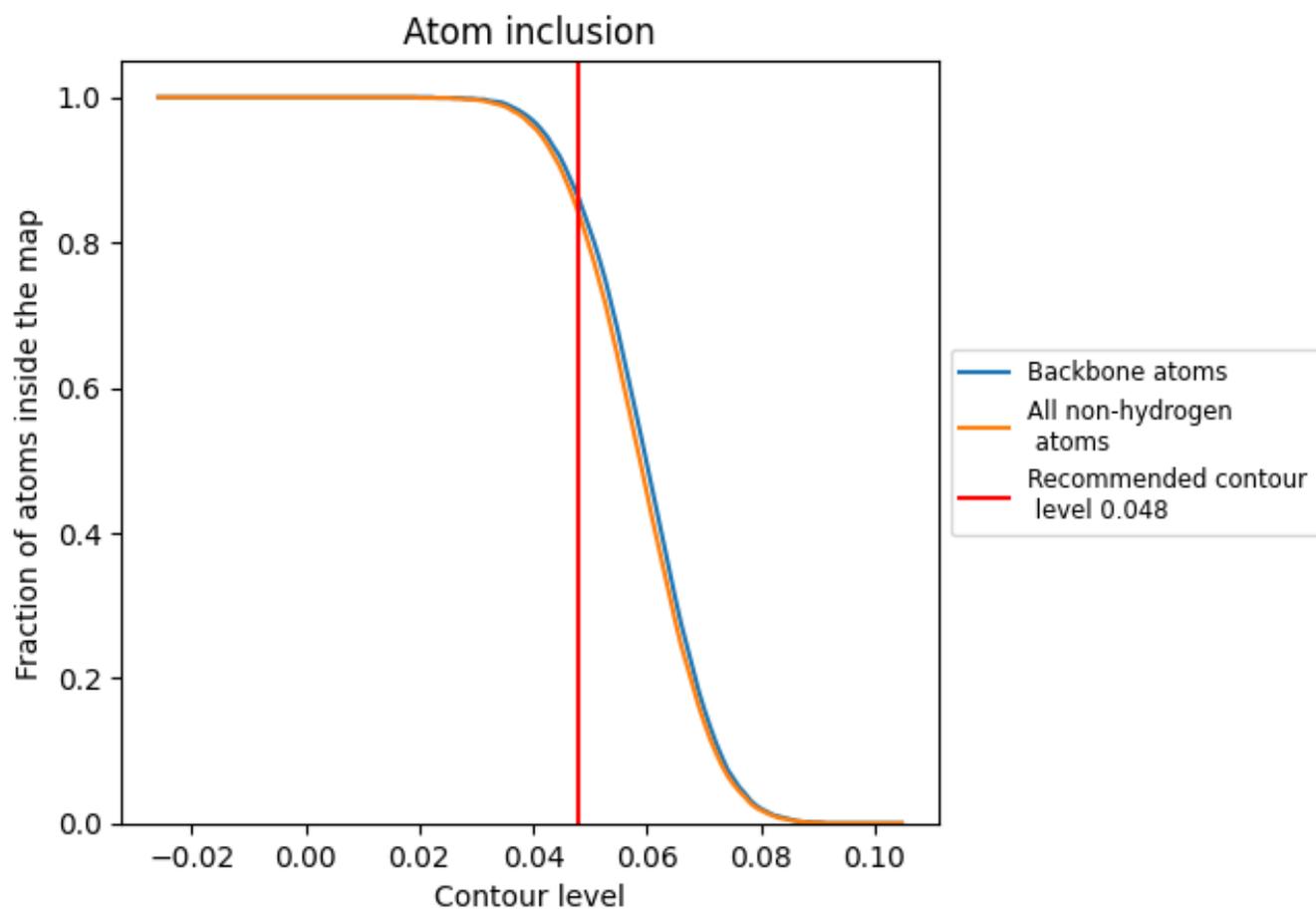
At the recommended contour level, 86% of all backbone atoms, 84% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.048) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8410	0.1930
A	0.9310	0.2070
B	0.9380	0.2140
C	0.9400	0.2030
D	0.9350	0.2040
E	0.8180	0.1860
F	0.9340	0.2070
G	0.9300	0.2200
H	0.8550	0.2100
I	0.8730	0.2070
J	0.8770	0.2290
K	0.6550	0.1890
L	0.9600	0.2190
M	0.5010	0.0940
N	0.5780	0.1320
O	0.4300	0.1140
P	0.4960	0.1340
Q	0.4820	0.1470
R	0.5590	0.1570
S	0.5100	0.1100
T	0.5620	0.1330
U	0.5200	0.1190
V	0.5370	0.1070

1.0

0.0

<0.0