



## wwPDB EM Validation Summary Report ⓘ

Mar 6, 2026 – 11:28 PM UTC

PDB ID : 6BCX / pdb\_00006bcx  
EMDB ID : EMD-7087  
Title : mTORC1 structure refined to 3.0 angstroms  
Authors : Pavletich, N.P.; Yang, H.  
Deposited on : 2017-10-20  
Resolution : 3.23 Å(reported)

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

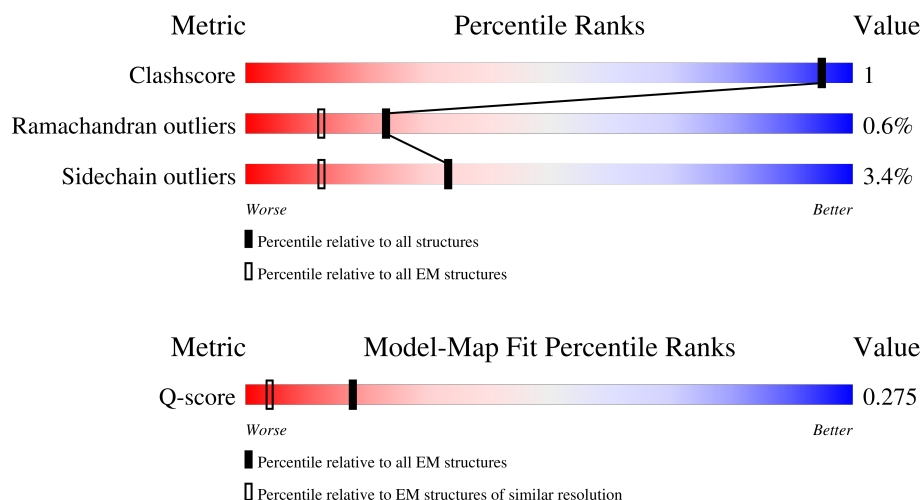
EMDB validation analysis : 0.0.1.dev132  
Mogul : 2022.3.0, CSD as543be (2022)  
MolProbity : 4-5-2 with Phenix2.0  
Buster-report : wwPDB partial adaption of 1.1.7 (2018)  
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)  
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.49

# 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 3.23 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)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	14612 ( 2.73 - 3.73 )

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion  $< 40\%$ ). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	2549	<div> <div>20%</div> <div>80%</div> <div>5%</div> <div>15%</div> </div>
1	B	2549	<div> <div>20%</div> <div>80%</div> <div>5%</div> <div>15%</div> </div>
2	D	326	<div> <div>42%</div> <div>90%</div> <div>6%</div> <div>...</div> </div>
2	E	326	<div> <div>39%</div> <div>90%</div> <div>7%</div> <div>...</div> </div>

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Mol	Chain	Length	Quality of chain
3	W	1343	<div><div><div></div><div></div><div></div></div><div>39%73%5%22%</div></div>
3	Y	1343	<div><div><div></div><div></div><div></div></div><div>39%73%.22%</div></div>
4	X	122	<div><div><div></div><div></div><div></div></div><div>7%93%</div></div>
4	Z	122	<div><div><div></div><div></div><div></div></div><div>7%93%</div></div>

## 2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 113610 atoms, of which 57030 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 Serine/threonine-protein kinase mTOR.

Mol	Chain	Residues	Atoms						AltConf	Trace
1	A	2178	Total	C	H	N	O	S	0	0
			35034	11082	17686	3038	3117	111		
1	B	2178	Total	C	H	N	O	S	0	0
			35034	11082	17686	3038	3117	111		

- Molecule 2 is a protein called Target of rapamycin complex subunit LST8.

Mol	Chain	Residues	Atoms						AltConf	Trace
2	D	317	Total	C	H	N	O	S	0	0
			4809	1526	2353	436	476	18		
2	E	317	Total	C	H	N	O	S	0	0
			4809	1526	2353	436	476	18		

- Molecule 3 is a protein called Regulatory-associated protein of mTOR.

Mol	Chain	Residues	Atoms						AltConf	Trace
3	W	1052	Total	C	H	N	O	S	0	0
			16791	5361	8406	1450	1518	56		
3	Y	1052	Total	C	H	N	O	S	0	0
			16791	5361	8406	1450	1518	56		

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
W	-7	MET	-	initiating methionine	UNP Q8N122
W	-6	ASP	-	expression tag	UNP Q8N122
W	-5	TYR	-	expression tag	UNP Q8N122
W	-4	LYS	-	expression tag	UNP Q8N122
W	-3	ASP	-	expression tag	UNP Q8N122
W	-2	ASP	-	expression tag	UNP Q8N122
W	-1	ASP	-	expression tag	UNP Q8N122
W	0	ASP	-	expression tag	UNP Q8N122
W	1	LYS	-	expression tag	UNP Q8N122

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Chain	Residue	Modelled	Actual	Comment	Reference
Y	-7	MET	-	initiating methionine	UNP Q8N122
Y	-6	ASP	-	expression tag	UNP Q8N122
Y	-5	TYR	-	expression tag	UNP Q8N122
Y	-4	LYS	-	expression tag	UNP Q8N122
Y	-3	ASP	-	expression tag	UNP Q8N122
Y	-2	ASP	-	expression tag	UNP Q8N122
Y	-1	ASP	-	expression tag	UNP Q8N122
Y	0	ASP	-	expression tag	UNP Q8N122
Y	1	LYS	-	expression tag	UNP Q8N122

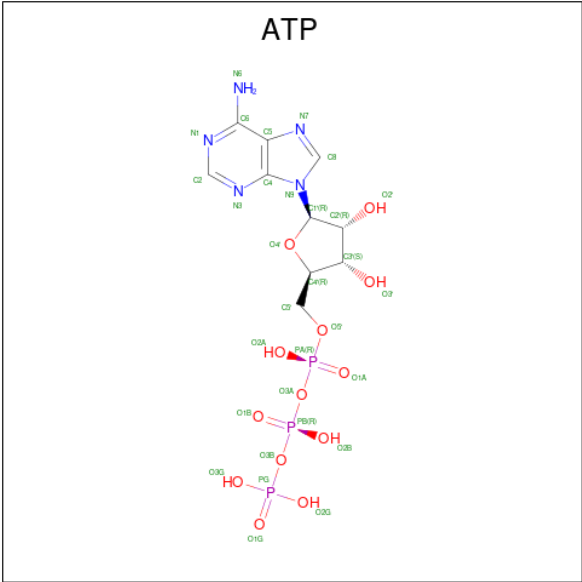
- Molecule 4 is a protein called Eukaryotic translation initiation factor 4E-binding protein 1.

Mol	Chain	Residues	Atoms						AltConf	Trace
4	X	8	Total	C	H	N	O	S	0	0
			126	42	58	9	16	1		
4	Z	8	Total	C	H	N	O	S	0	0
			126	42	58	9	16	1		

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
X	-3	GLY	-	expression tag	UNP Q13541
X	-2	SER	-	expression tag	UNP Q13541
X	-1	GLY	-	expression tag	UNP Q13541
X	0	ARG	-	expression tag	UNP Q13541
Z	-3	GLY	-	expression tag	UNP Q13541
Z	-2	SER	-	expression tag	UNP Q13541
Z	-1	GLY	-	expression tag	UNP Q13541
Z	0	ARG	-	expression tag	UNP Q13541

- Molecule 5 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: C<sub>10</sub>H<sub>16</sub>N<sub>5</sub>O<sub>13</sub>P<sub>3</sub>).



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

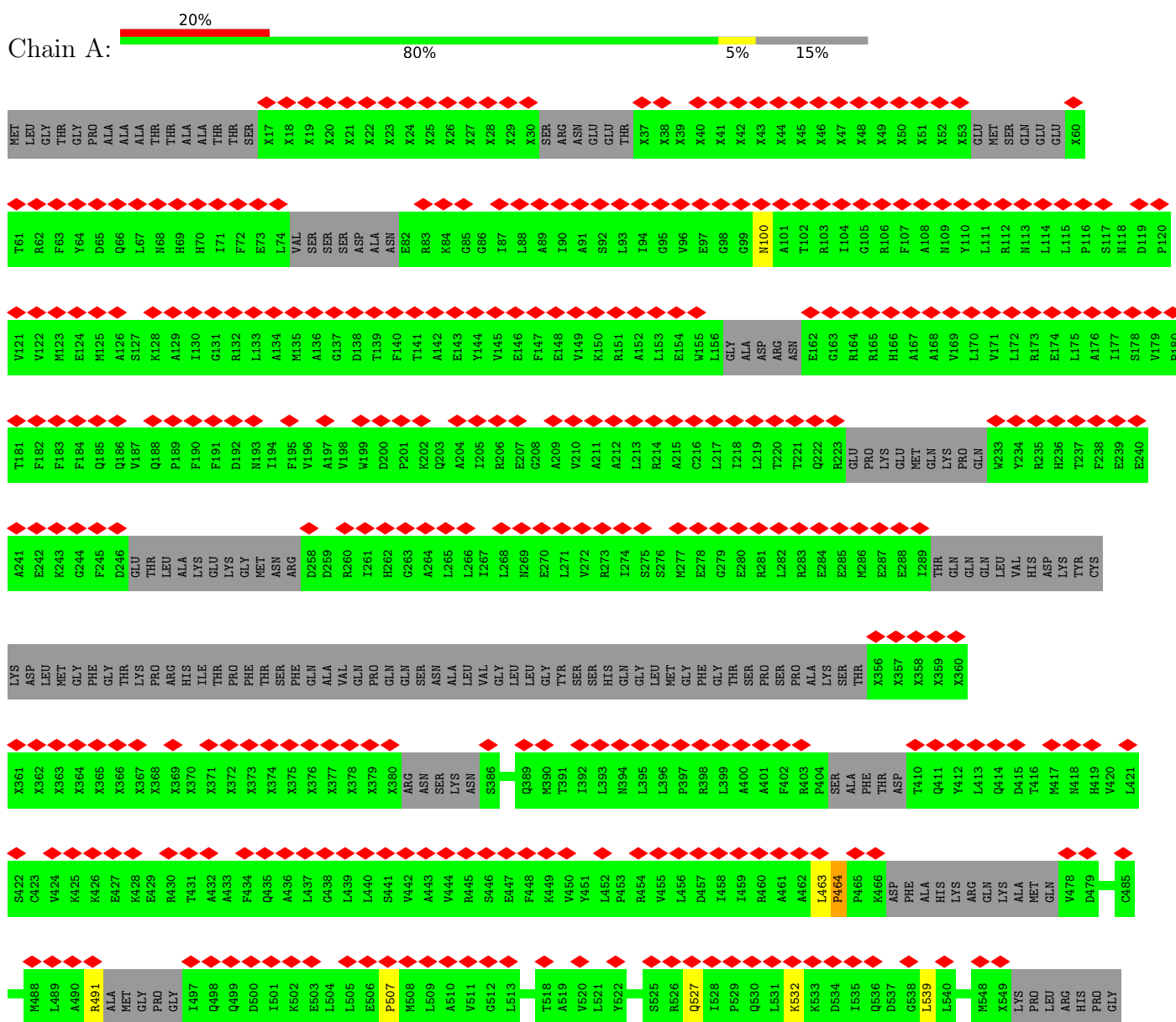
- Molecule 6 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

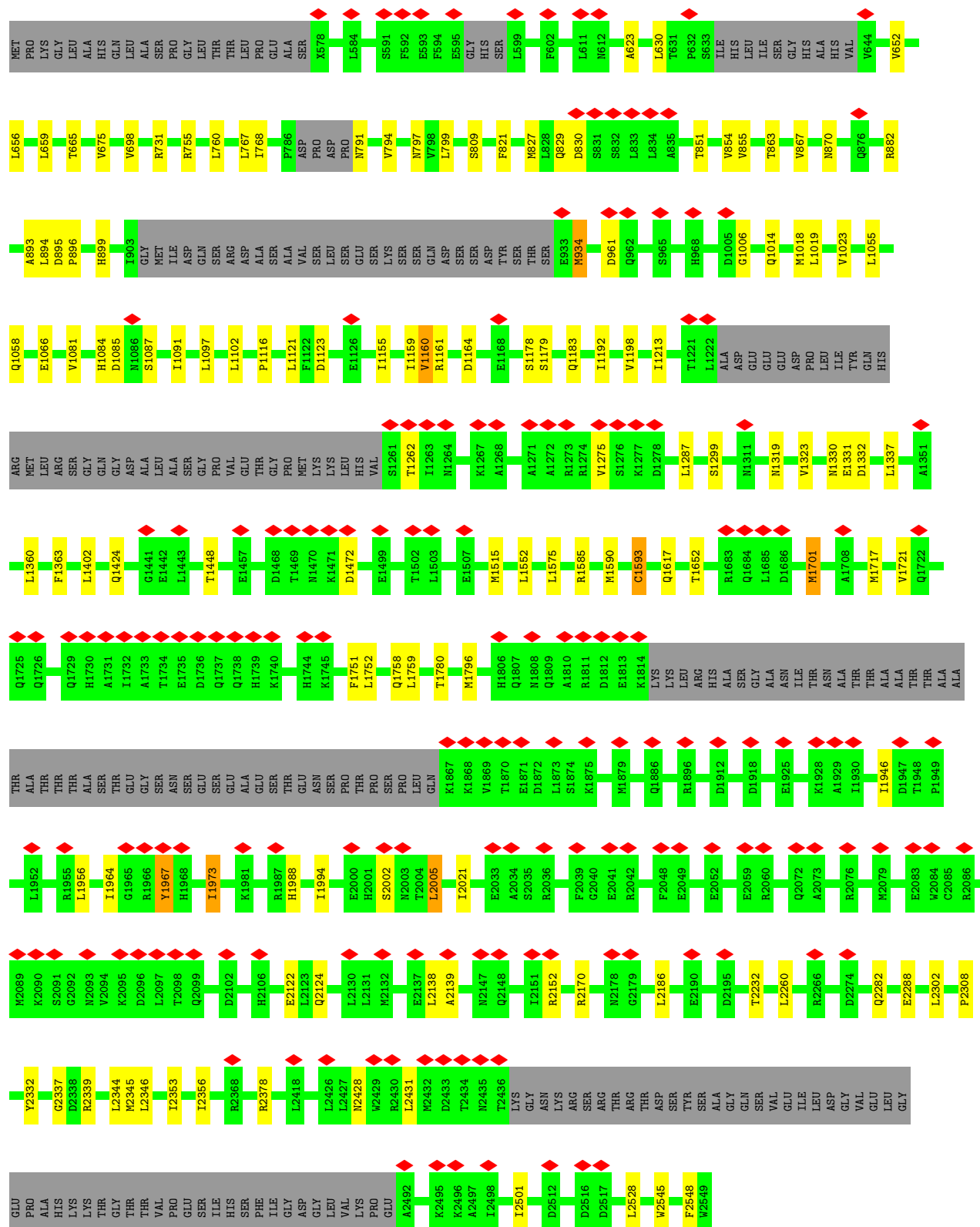
Mol	Chain	Residues	Atoms		AltConf
6	A	2	Total	Mg	0
			2	2	
6	B	2	Total	Mg	0
			2	2	

### 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: Serine/threonine-protein kinase mTOR





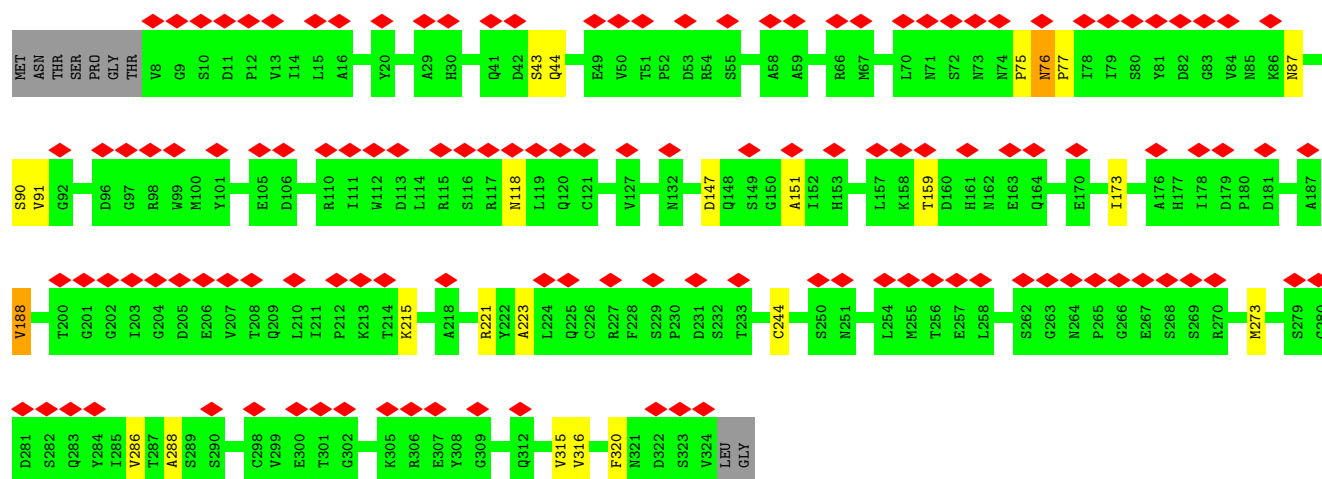
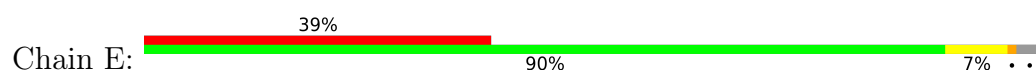
- Molecule 1: Serine/threonine-protein kinase mTOR

Chain B: 20% 80% 5% 15%

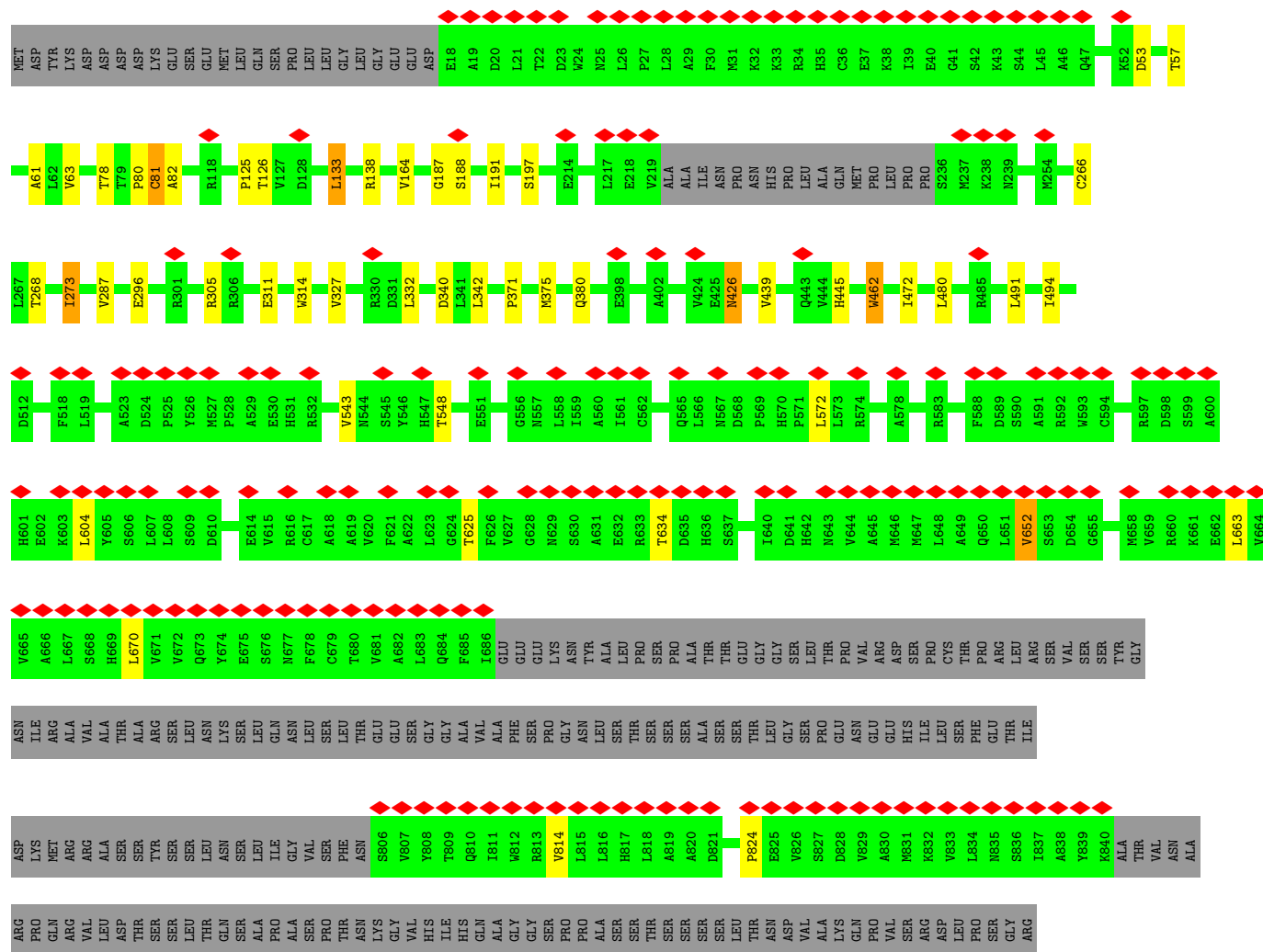
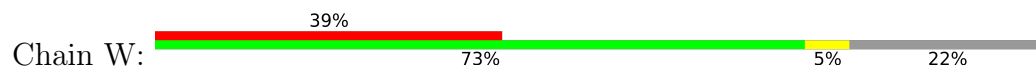


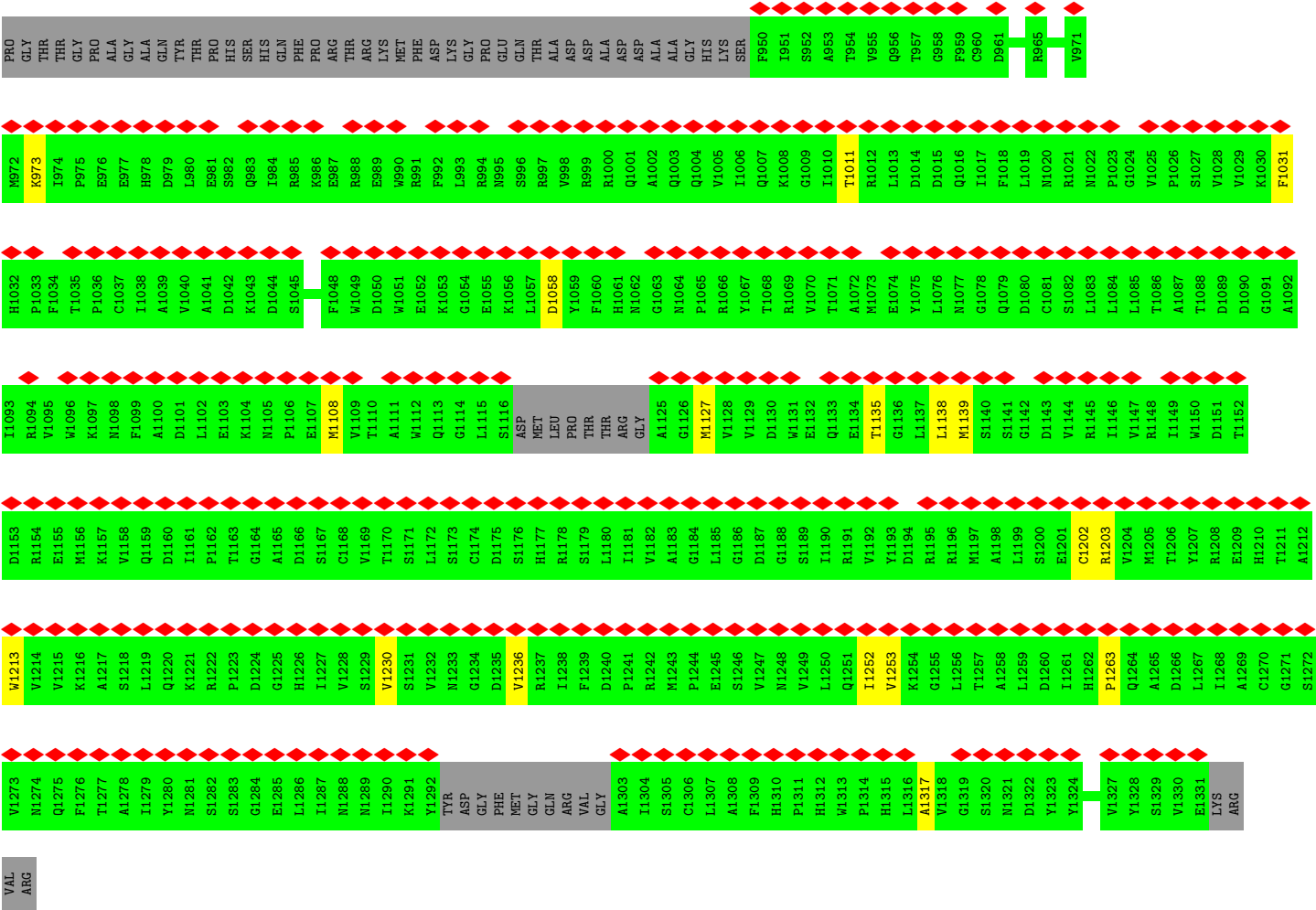
H1084	P896	T665	GLY	T484	S422	X361	LYS	A241	T181	V121	T61	MET
D1085	H899	V675	ALA	C485	C423	X362	ASP	E242	F182	V122	R62	LEU
S1087	I903	L489	HIS	L469	V424	X363	NET	R243	F183	V123	F63	THR
I1091	I903	L490	GLN	X364	K425	G244	PHE	G244	F184	E124	Y64	GLY
L1097	I903	R491	ALA	X367	K426	F245	GLY	D246	Q186	M125	D65	PRO
L1102	I903	R491	ALA	X368	E427	X368	THR	GLY	Q187	M126	Q66	ALA
L1121	I903	R491	ALA	X369	K428	X369	THR	THR	Q188	M127	L67	ALA
F1122	I903	R491	ALA	X370	E429	X370	PRO	ALA	Q188	M128	L67	ALA
D1123	I903	R491	ALA	X371	R430	X371	PRO	ALA	Q189	M129	H69	THR
E1126	I903	R491	ALA	X372	T431	X372	ILE	ALA	F189	M130	H70	ALA
I1155	I903	R491	ALA	X373	A432	X373	THR	GLY	G131	M133	I71	THR
I1159	I903	R491	ALA	X374	A433	X374	THR	GLY	D192	M133	F72	THR
V1160	I903	R491	ALA	X375	F434	X375	PHE	GLY	M193	M134	E73	SER
R1161	I903	R491	ALA	X376	Q435	X376	THR	ASN	M194	M135	L74	SER
D1164	I903	R491	ALA	X377	A436	X377	PHE	ARG	F195	M135	VAL	SER
E1168	I903	R491	ALA	X378	L437	X378	GLN	D258	V196	M136	SER	SER
S1178	I903	R491	ALA	X379	L437	X379	ALA	D259	V196	M136	SER	SER
S1178	I903	R491	ALA	X380	L437	X380	ALA	D260	V196	M136	SER	SER
Q1183	I903	R491	ALA	X381	L437	X381	ALA	D261	V196	M136	SER	SER
I1192	I903	R491	ALA	X382	L437	X382	ALA	D262	V196	M136	SER	SER
V1198	I903	R491	ALA	X383	L437	X383	ALA	D263	V196	M136	SER	SER
I1213	I903	R491	ALA	X384	L437	X384	ALA	D264	V196	M136	SER	SER
T1221	I903	R491	ALA	X385	L437	X385	ALA	D265	V196	M136	SER	SER
L1222	I903	R491	ALA	X386	L437	X386	ALA	D266	V196	M136	SER	SER
ALA	I903	R491	ALA	X387	L437	X387	ALA	D267	V196	M136	SER	SER
ASP	I903	R491	ALA	X388	L437	X388	ALA	D268	V196	M136	SER	SER
GLY	I903	R491	ALA	X389	L437	X389	ALA	D269	V196	M136	SER	SER
GLY	I903	R491	ALA	X390	L437	X390	ALA	D270	V196	M136	SER	SER
ASP	I903	R491	ALA	X391	L437	X391	ALA	D271	V196	M136	SER	SER
LEU	I903	R491	ALA	X392	L437	X392	ALA	D272	V196	M136	SER	SER
ILE	I903	R491	ALA	X393	L437	X393	ALA	D273	V196	M136	SER	SER
PRO	I903	R491	ALA	X394	L437	X394	ALA	D274	V196	M136	SER	SER
ILE	I903	R491	ALA	X395	L437	X395	ALA	D275	V196	M136	SER	SER
GLN	I903	R491	ALA	X396	L437	X396	ALA	D276	V196	M136	SER	SER
HIS	I903	R491	ALA	X397	L437	X397	ALA	D277	V196	M136	SER	SER
ARG	I903	R491	ALA	X398	L437	X398	ALA	D278	V196	M136	SER	SER
MET	I903	R491	ALA	X399	L437	X399	ALA	D279	V196	M136	SER	SER
LEU	I903	R491	ALA	X400	L437	X400	ALA	D280	V196	M136	SER	SER
THR	I903	R491	ALA	X401	L437	X401	ALA	D281	V196	M136	SER	SER
GLY	I903	R491	ALA	X402	L437	X402	ALA	D282	V196	M136	SER	SER
ASP	I903	R491	ALA	X403	L437	X403	ALA	D283	V196	M136	SER	SER
LEU	I903	R491	ALA	X404	L437	X404	ALA	D284	V196	M136	SER	SER
THR	I903	R491	ALA	X405	L437	X405	ALA	D285	V196	M136	SER	SER
ASP	I903	R491	ALA	X406	L437	X406	ALA	D286	V196	M136	SER	SER
GLY	I903	R491	ALA	X407	L437	X407	ALA	D287	V196	M136	SER	SER
GLY	I903	R491	ALA	X408	L437	X408	ALA	D288	V196	M136	SER	SER
ASP	I903	R491	ALA	X409	L437	X409	ALA	D289	V196	M136	SER	SER
LEU	I903	R491	ALA	X410	L437	X410	ALA	D290	V196	M136	SER	SER
THR	I903	R491	ALA	X411	L437	X411	ALA	D291	V196	M136	SER	SER
GLY	I903	R491	ALA	X412	L437	X412	ALA	D292	V196	M136	SER	SER
ASP	I903	R491	ALA	X413	L437	X413	ALA	D293	V196	M136	SER	SER
GLY	I903	R491	ALA	X414	L437	X414	ALA	D294	V196	M136	SER	SER
GLY	I903	R491	ALA	X415	L437	X415	ALA	D295	V196	M136	SER	SER
GLY	I903	R491	ALA	X416	L437	X416	ALA	D296	V196	M136	SER	SER
GLY	I903	R491	ALA	X417	L437	X417	ALA	D297	V196	M136	SER	SER
GLY	I903	R491	ALA	X418	L437	X418	ALA	D298	V196	M136	SER	SER
GLY	I903	R491	ALA	X419	L437	X419	ALA	D299	V196	M136	SER	SER
GLY	I903	R491	ALA	X420	L437	X420	ALA	D300	V196	M136	SER	SER
GLY	I903	R491	ALA	X421	L437	X421	ALA	D301	V196	M136	SER	SER
GLY	I903	R491	ALA	X422	L437	X422	ALA	D302	V196	M136	SER	SER
GLY	I903	R491	ALA	X423	L437	X423	ALA	D303	V196	M136	SER	SER
GLY	I903	R491	ALA	X424	L437	X424	ALA	D304	V196	M136	SER	SER
GLY	I903	R491	ALA	X425	L437	X425	ALA	D305	V196	M136	SER	SER
GLY	I903	R491	ALA	X426	L437	X426	ALA	D306	V196	M136	SER	SER
GLY	I903	R491	ALA	X427	L437	X427	ALA	D307	V196	M136	SER	SER
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GLY	I903	R491	ALA	X450	L437	X450	ALA	D330	V196	M136	SER	SER
GLY	I903	R491	ALA	X451	L437	X451	ALA	D331	V196	M136	SER	SER
GLY	I903	R491	ALA	X452	L437	X452	ALA	D332	V196	M136	SER	SER
GLY	I903	R491	ALA	X453	L437	X453	ALA	D333	V196	M136	SER	SER
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GLY	I903	R491	ALA	X461	L437	X461	ALA	D341	V196	M136	SER	SER
GLY	I903	R491	ALA	X462	L437	X462	ALA	D342	V196	M136	SER	SER
GLY	I903	R491	ALA	X463	L437	X463	ALA	D343	V196	M136	SER	SER
GLY	I903	R491	ALA	X464	L437	X464	ALA	D344	V196	M136	SER	SER
GLY	I903	R491	ALA	X465	L437	X465	ALA	D345	V196	M136	SER	SER
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GLY	I903	R491	ALA	X472	L437	X472	ALA	D352	V196	M136	SER	SER
GLY	I903	R491	ALA	X473	L437	X473	ALA	D353	V196	M136	SER	SER
GLY	I903	R491	ALA	X474	L437	X474	ALA	D354	V196	M136	SER	SER
GLY	I903	R491	ALA	X475	L437	X475	ALA	D355	V196	M136	SER	SER
GLY	I903	R491	ALA	X476	L437	X476	ALA	D356	V196	M136	SER	SER
GLY	I903	R491	ALA	X477	L437	X477	ALA	D357	V196	M136	SER	SER
GLY	I903	R491	ALA	X478	L437	X478	ALA	D358	V196	M136	SER	SER
GLY	I903	R491	ALA	X479	L437	X479	ALA	D359	V196	M136	SER	SER
GLY	I903	R491	ALA	X480	L437	X480	ALA	D360	V196	M136	SER	SER
GLY	I903	R491	ALA	X481	L437	X481	ALA	D361	V196	M136	SER	SER
GLY	I903	R491	ALA	X482	L437	X482	ALA	D362	V196	M136	SER	SER
GLY	I903	R491	ALA	X483	L437	X483	ALA	D363	V196	M136	SER	SER
GLY	I903	R491	ALA	X484	L437	X484	ALA	D364	V196	M136	SER	SER
GLY	I903	R491	ALA	X485	L437	X485	ALA	D365	V196	M136	SER	SER
GLY	I903	R491										



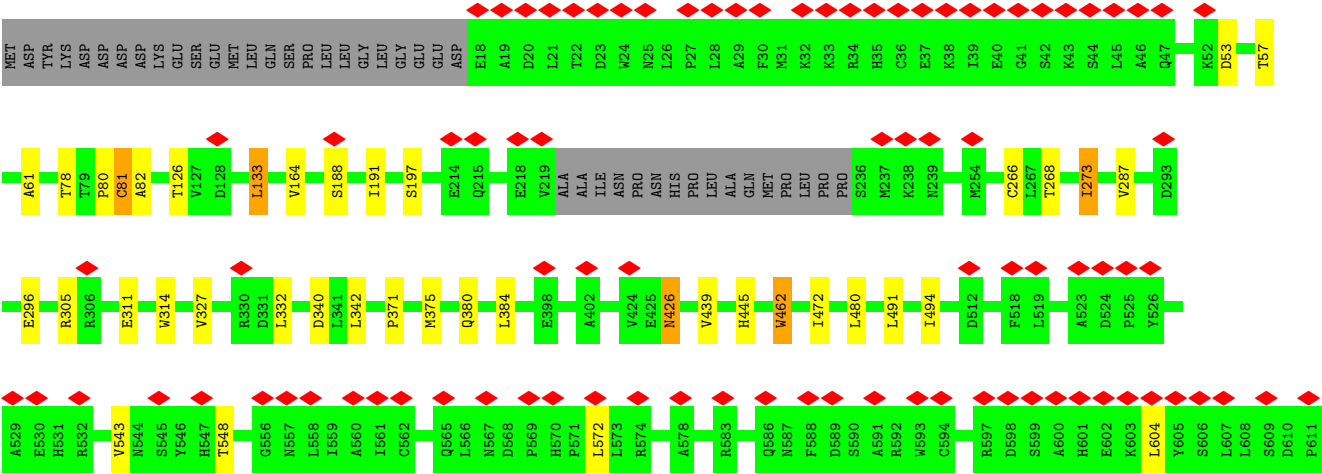
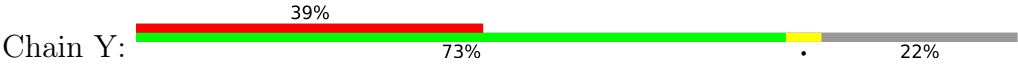


• Molecule 3: Regulatory-associated protein of mTOR

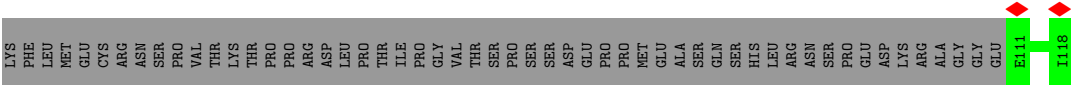




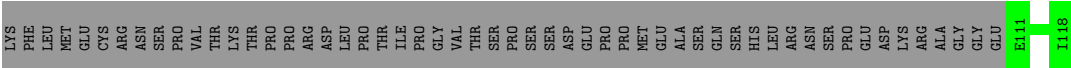
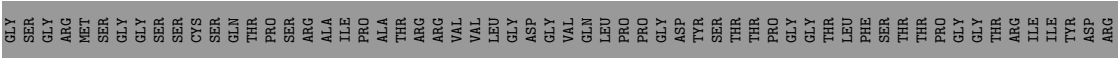
● Molecule 3: Regulatory-associated protein of mTOR







● Molecule 4: Eukaryotic translation initiation factor 4E-binding protein 1



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C2	Depositor
Number of particles used	580768	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 ( $e^-/\text{\AA}^2$ )	56	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.282	Depositor
Minimum map value	-0.178	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.005	Depositor
Recommended contour level	0.03	Depositor
Map size (Å)	497.6444, 497.6444, 497.6444	wwPDB
Map dimensions	374, 374, 374	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.3306, 1.3306, 1.3306	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: ATP, 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	0.61	1/17398 (0.0%)	0.90	8/23547 (0.0%)
1	B	0.61	1/17398 (0.0%)	0.90	7/23547 (0.0%)
2	D	0.57	0/2514	0.75	0/3426
2	E	0.57	0/2514	0.75	0/3426
3	W	0.58	0/8585	0.84	1/11680 (0.0%)
3	Y	0.58	0/8585	0.83	1/11680 (0.0%)
4	X	0.53	0/68	0.65	0/89
4	Z	0.52	0/68	0.65	0/89
All	All	0.60	2/57130 (0.0%)	0.87	17/77484 (0.0%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	100	ASN	CA-C	6.00	1.55	1.52
1	B	100	ASN	CA-C	5.96	1.55	1.52

The worst 5 of 17 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	464	PRO	N-CA-C	7.63	120.01	110.70
1	B	464	PRO	N-CA-C	7.63	120.00	110.70
1	B	1973	ILE	N-CA-CB	6.05	118.77	110.54
1	A	1973	ILE	N-CA-CB	6.02	118.73	110.54
1	B	895	ASP	CA-C-N	5.77	127.05	119.84

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	17348	17686	17376	38	0
1	B	17348	17686	17376	38	0
2	D	2456	2353	2341	9	0
2	E	2456	2353	2341	9	0
3	W	8385	8406	8375	19	0
3	Y	8385	8406	8375	16	0
4	X	68	58	57	0	0
4	Z	68	58	57	0	0
5	A	31	12	12	0	0
5	B	31	12	12	0	0
6	A	2	0	0	0	0
6	B	2	0	0	0	0
All	All	56580	57030	56322	123	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 1.

The worst 5 of 123 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2378:ARG:NH2	1:A:2545:TRP:O	2.18	0.77
1:B:2378:ARG:NH2	1:B:2545:TRP:O	2.18	0.77
3:Y:426:ASN:N	3:Y:426:ASN:HD22	1.96	0.63
3:W:426:ASN:HD22	3:W:426:ASN:N	1.96	0.60
1:B:755:ARG:HB2	1:B:797:ASN:HD22	1.68	0.58

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	2088/2549 (82%)	1972 (94%)	107 (5%)	9 (0%)	30	60
1	B	2088/2549 (82%)	1973 (94%)	106 (5%)	9 (0%)	30	60
2	D	315/326 (97%)	279 (89%)	32 (10%)	4 (1%)	9	37
2	E	315/326 (97%)	279 (89%)	32 (10%)	4 (1%)	9	37
3	W	1040/1343 (77%)	948 (91%)	85 (8%)	7 (1%)	18	50
3	Y	1040/1343 (77%)	948 (91%)	85 (8%)	7 (1%)	18	50
4	X	6/122 (5%)	6 (100%)	0	0	100	100
4	Z	6/122 (5%)	5 (83%)	1 (17%)	0	100	100
All	All	6898/8680 (80%)	6410 (93%)	448 (6%)	40 (1%)	23	53

5 of 40 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	893	ALA
3	W	53	ASP
1	B	893	ALA
3	Y	53	ASP
1	A	1006	GLY

### 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	1861/2166 (86%)	1795 (96%)	66 (4%)	32	60
1	B	1861/2166 (86%)	1797 (97%)	64 (3%)	32	61
2	D	269/276 (98%)	263 (98%)	6 (2%)	45	68
2	E	269/276 (98%)	263 (98%)	6 (2%)	45	68
3	W	928/1171 (79%)	894 (96%)	34 (4%)	30	59
3	Y	928/1171 (79%)	894 (96%)	34 (4%)	30	59

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	X	8/104 (8%)	8 (100%)	0	100	100
4	Z	8/104 (8%)	8 (100%)	0	100	100
All	All	6132/7434 (82%)	5922 (97%)	210 (3%)	33	61

5 of 210 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	851	THR
1	B	1448	THR
3	Y	604	LEU
1	B	894	LEU
1	B	1160	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 92 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	1334	GLN
2	E	41	GLN
1	B	1525	GLN
1	B	2071	ASN
3	Y	114	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 oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 6 ligands modelled in this entry, 4 are monoatomic - leaving 2 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
5	ATP	A	3000	6	32,33,33	1.62	7 (21%)	48,52,52	1.76	11 (22%)
5	ATP	B	3000	6	32,33,33	1.63	7 (21%)	48,52,52	1.80	11 (22%)

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
5	ATP	A	3000	6	-	3/22/38/38	0/3/3/3
5	ATP	B	3000	6	-	4/22/38/38	0/3/3/3

The worst 5 of 14 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	3000	ATP	C5-C4	5.01	1.48	1.39
5	A	3000	ATP	C5-C4	4.71	1.47	1.39
5	B	3000	ATP	C5-C6	3.28	1.50	1.41
5	A	3000	ATP	C5-C6	3.23	1.50	1.41
5	A	3000	ATP	PB-O3A	3.20	1.62	1.59

The worst 5 of 22 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	3000	ATP	C5-C4-N3	-4.94	119.92	126.72
5	A	3000	ATP	C5-C4-N3	-4.90	119.96	126.72
5	A	3000	ATP	N3-C4-N9	3.92	133.83	127.17
5	B	3000	ATP	N3-C2-N1	-3.89	122.70	128.58
5	A	3000	ATP	N3-C2-N1	-3.86	122.73	128.58

There are no chirality outliers.

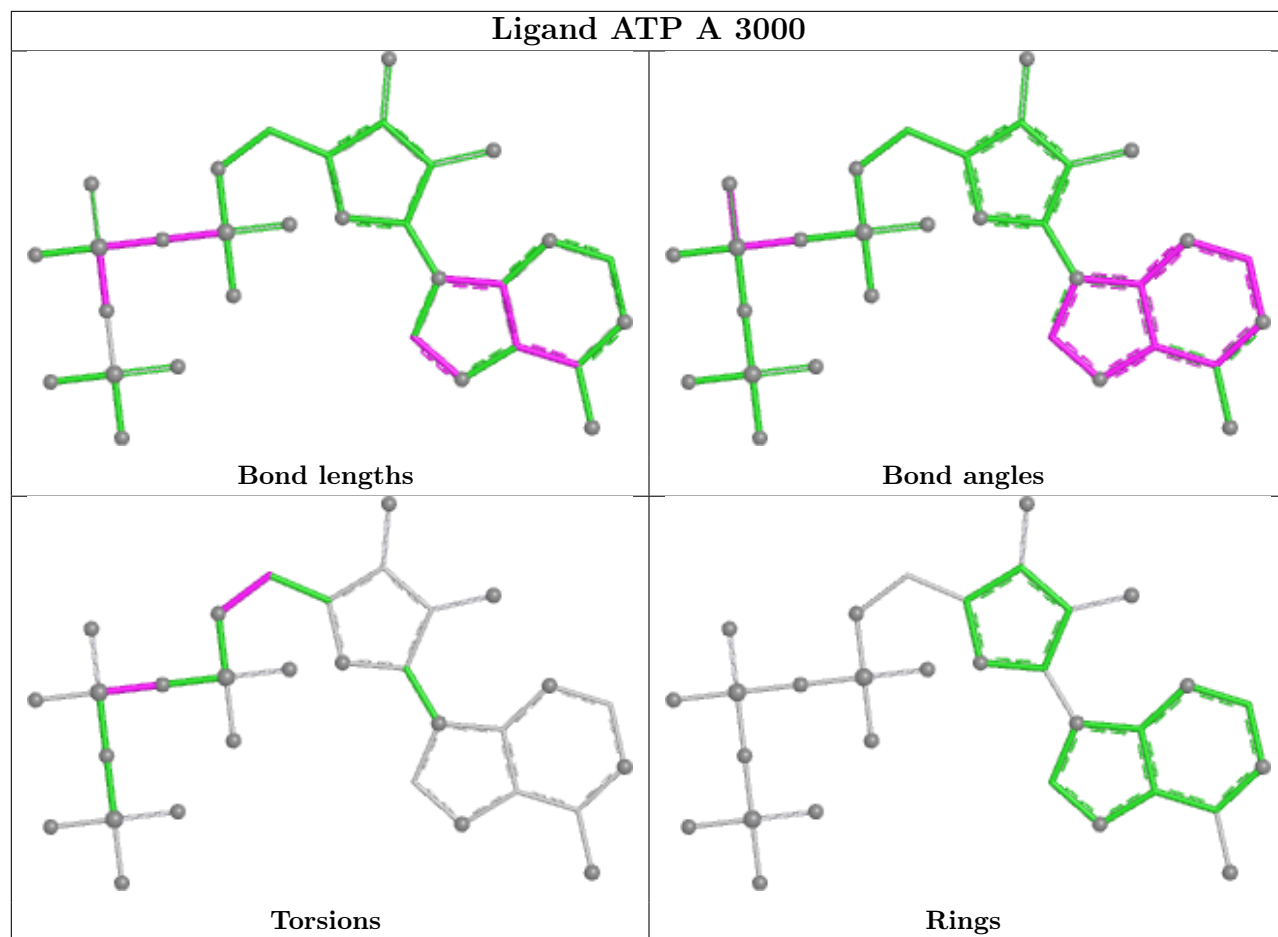
5 of 7 torsion outliers are listed below:

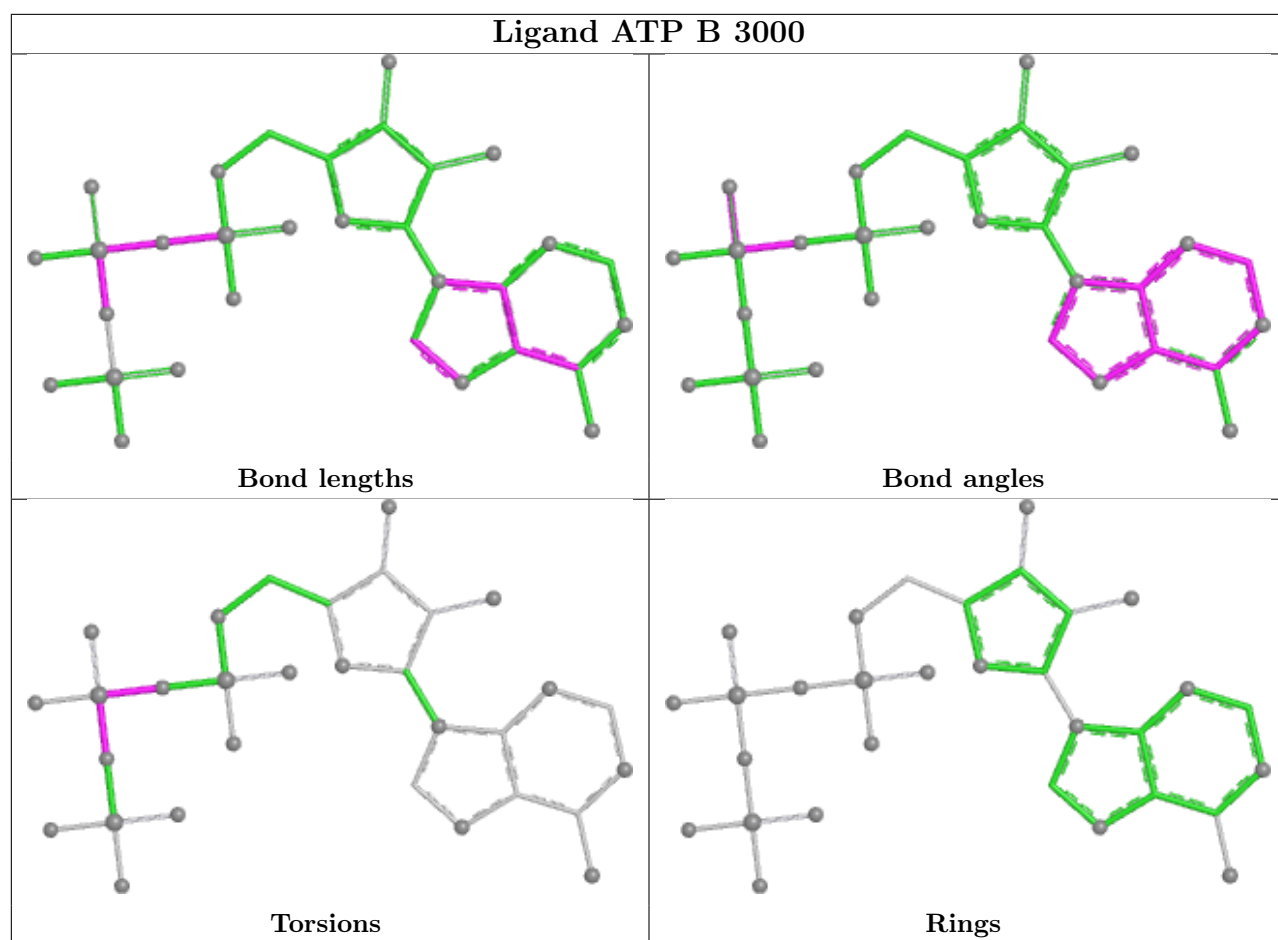
Mol	Chain	Res	Type	Atoms
5	B	3000	ATP	PG-O3B-PB-O1B
5	B	3000	ATP	PA-O3A-PB-O1B
5	A	3000	ATP	PA-O3A-PB-O2B
5	B	3000	ATP	PA-O3A-PB-O2B
5	A	3000	ATP	C4'-C5'-O5'-PA

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.

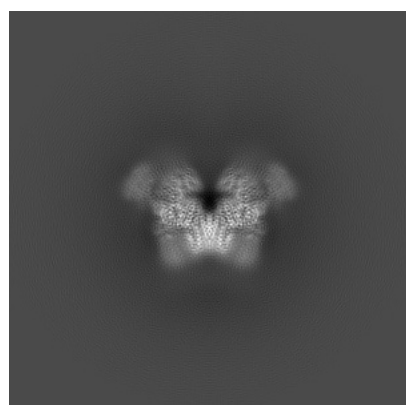
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-7087. These allow visual inspection of the internal detail of the map and identification of artifacts.

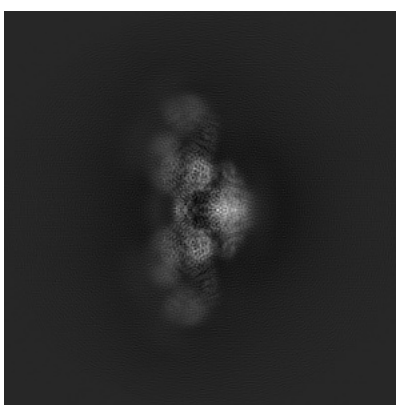
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

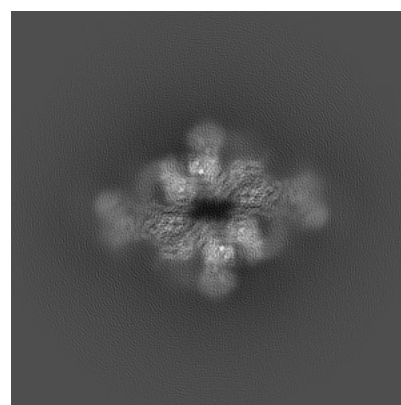
#### 6.1.1 Primary map



X



Y

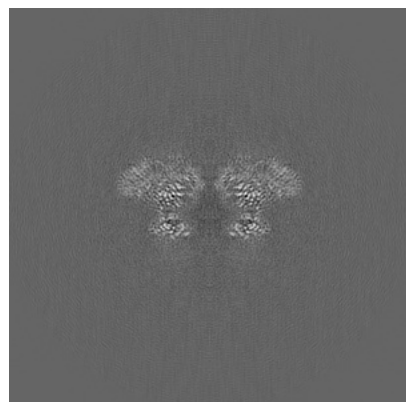


Z

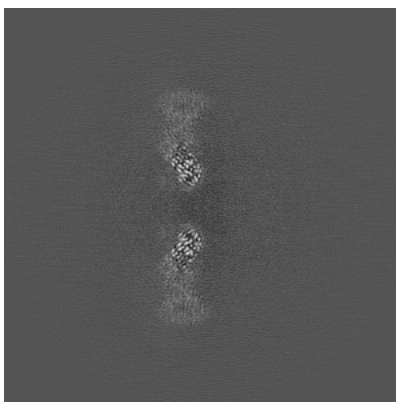
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

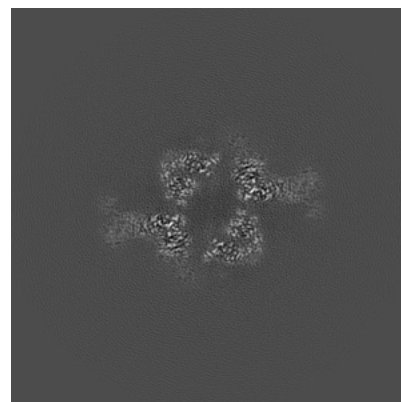
#### 6.2.1 Primary map



X Index: 187



Y Index: 187



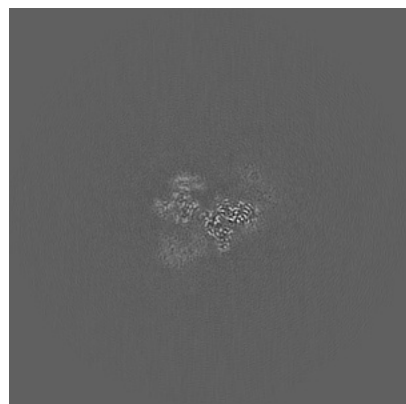
Z Index: 187



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

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

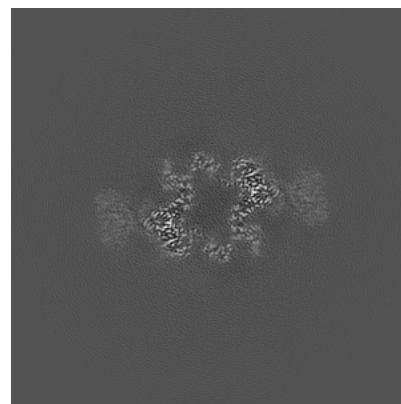
### 6.3.1 Primary map



X Index: 222



Y Index: 169

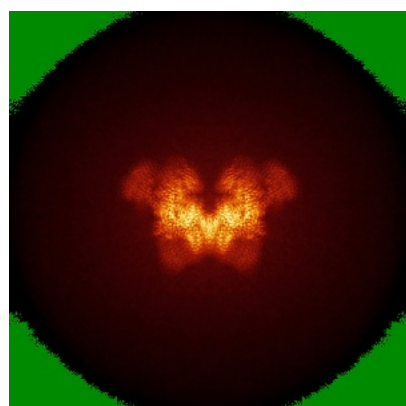


Z Index: 177

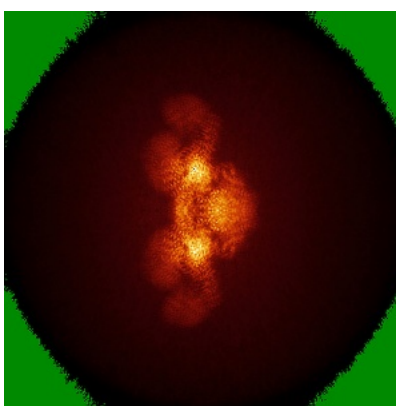
The images above show the largest variance slices of the map in three orthogonal directions.

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

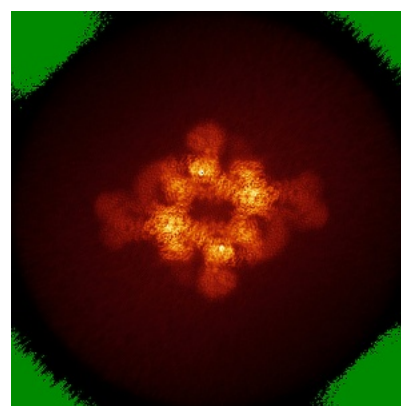
### 6.4.1 Primary map



X



Y

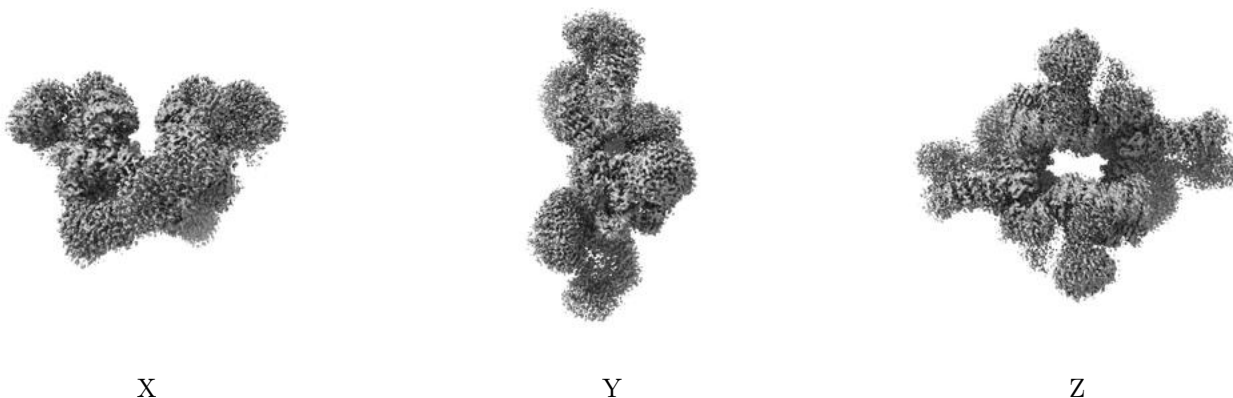


Z

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

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

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.03. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

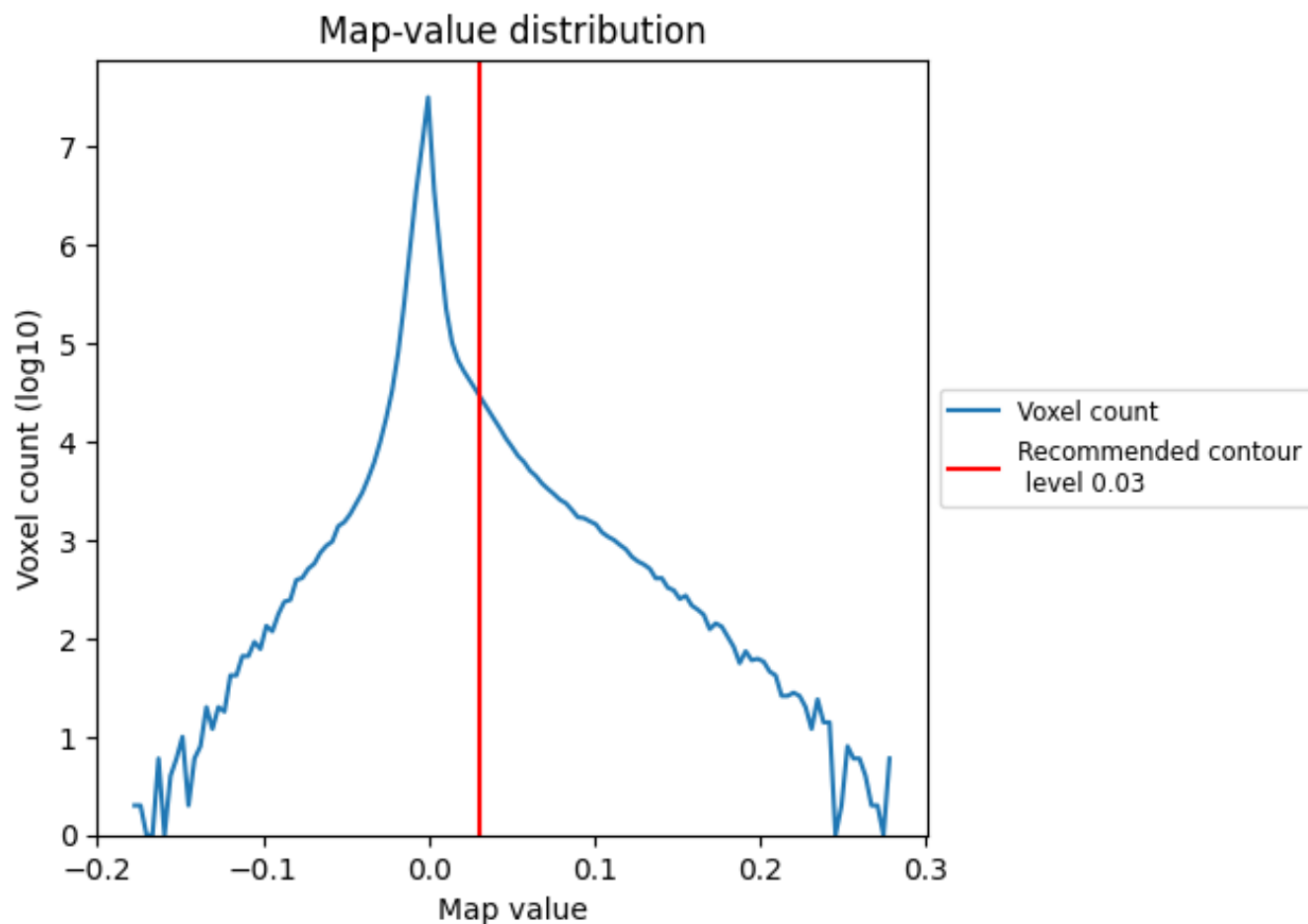
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

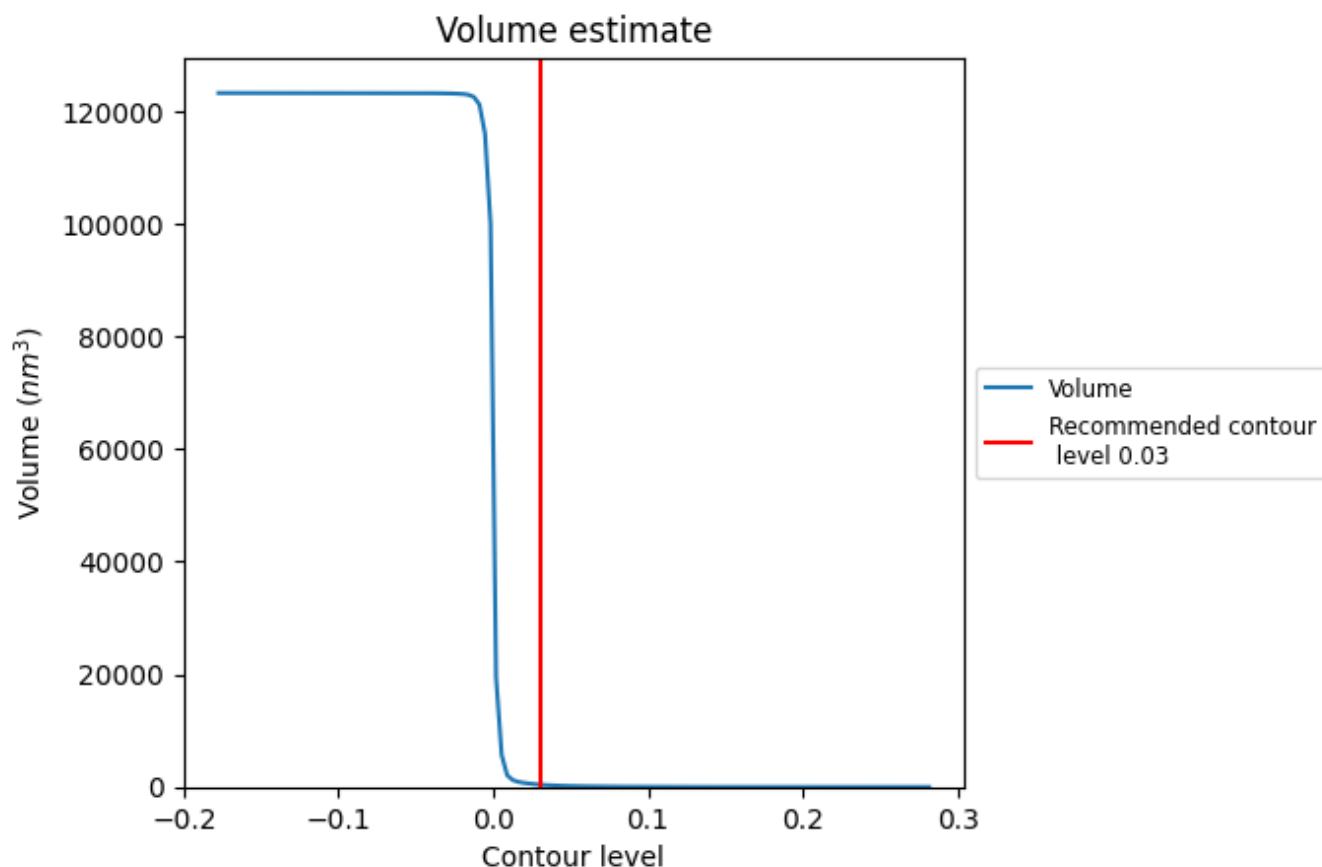
This section contains the results of statistical analysis of the map.

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



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

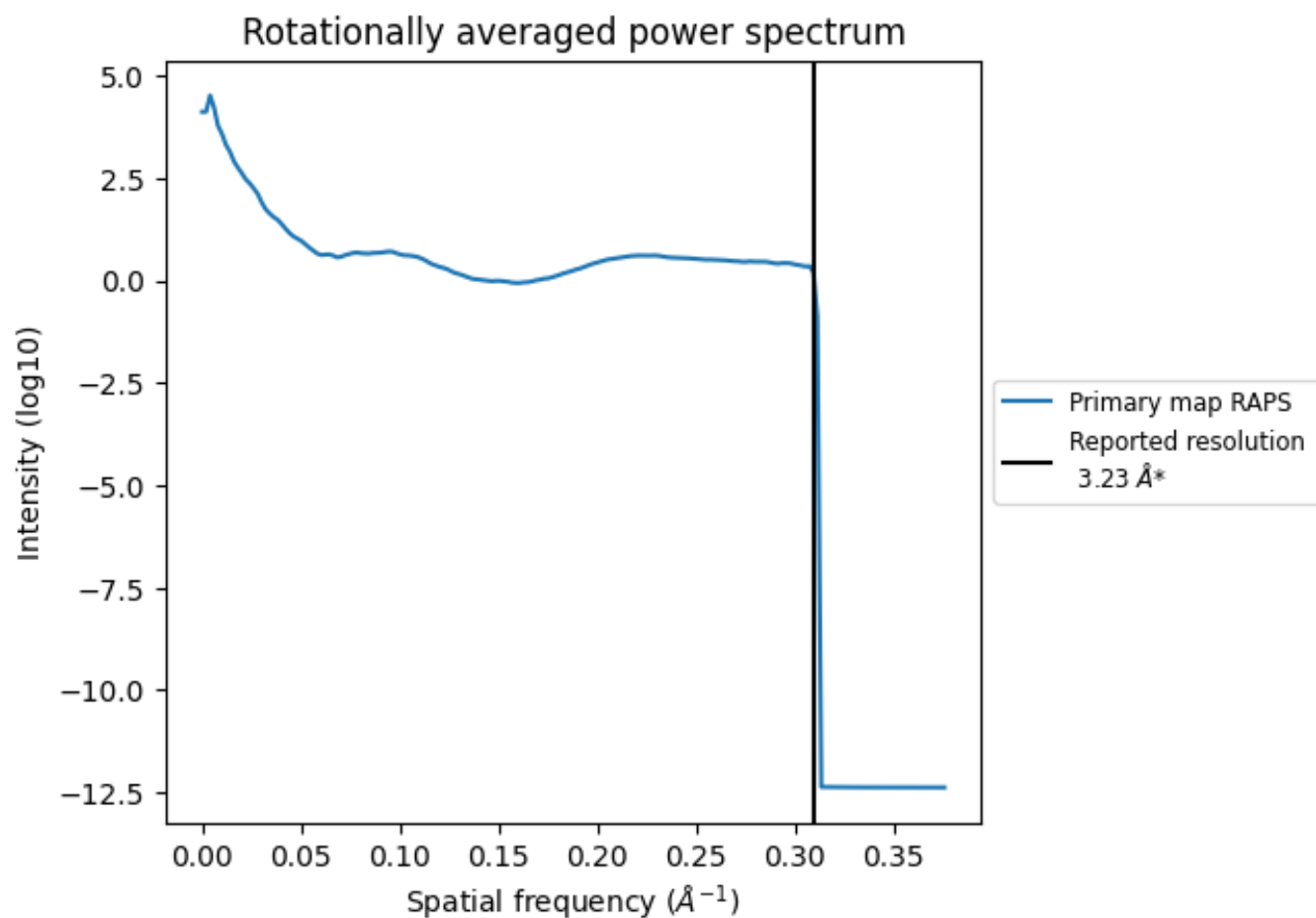
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 412  $\text{nm}^3$ ; this corresponds to an approximate mass of 372 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 0.310  $\text{\AA}^{-1}$

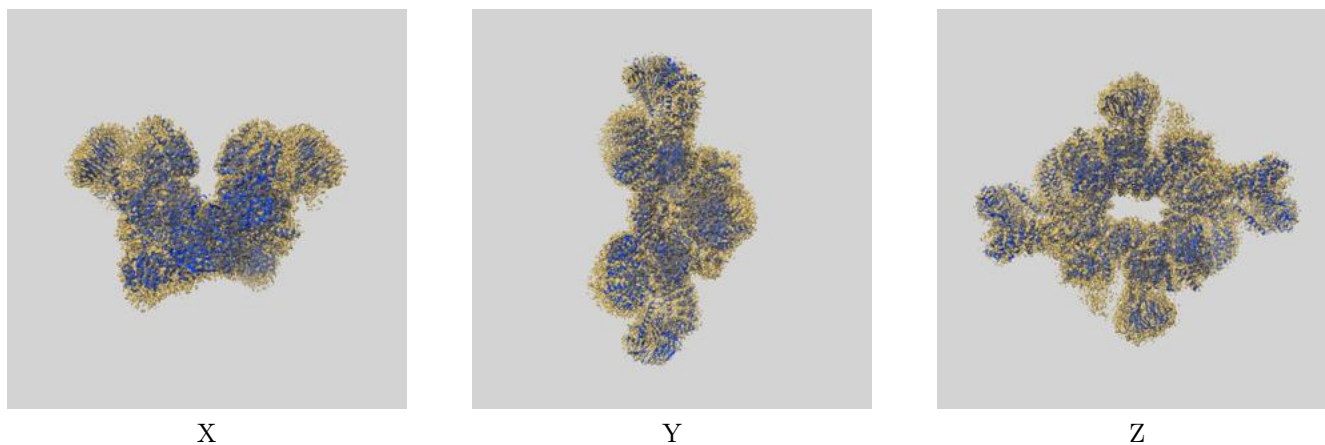
## 8 Fourier-Shell correlation

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

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

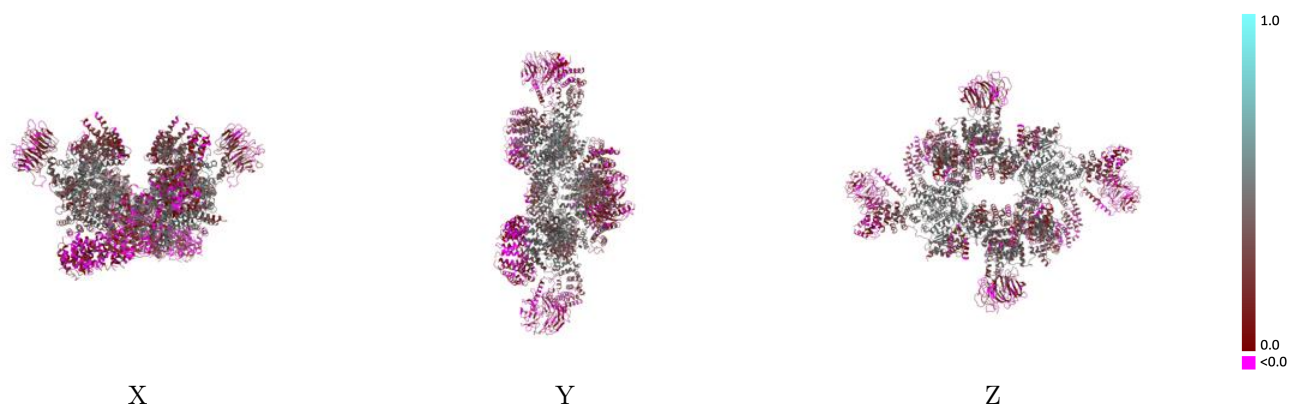
This section contains information regarding the fit between EMDB map EMD-7087 and PDB model 6BCX. Per-residue inclusion information can be found in section [3](#) on page [7](#).

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



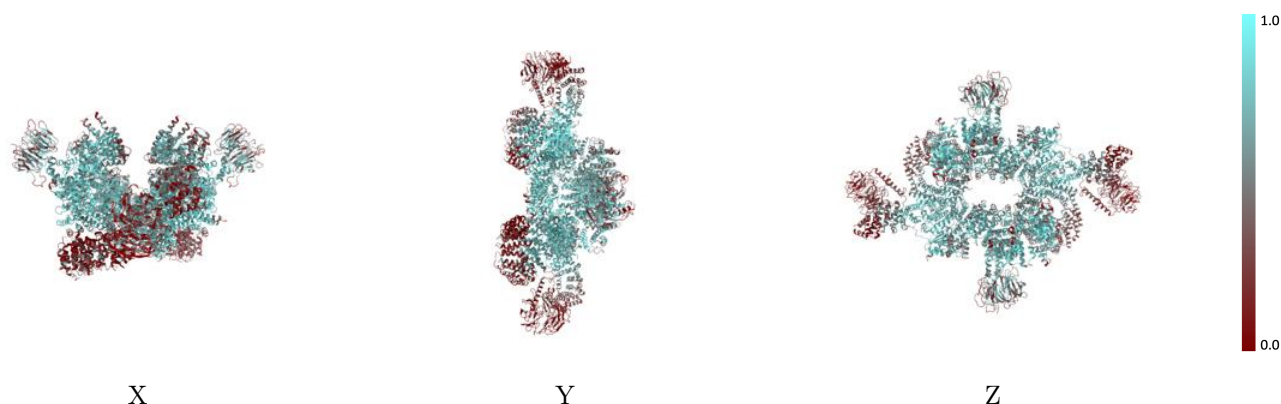
The images above show the 3D surface view of the map at the recommended contour level 0.03 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 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.

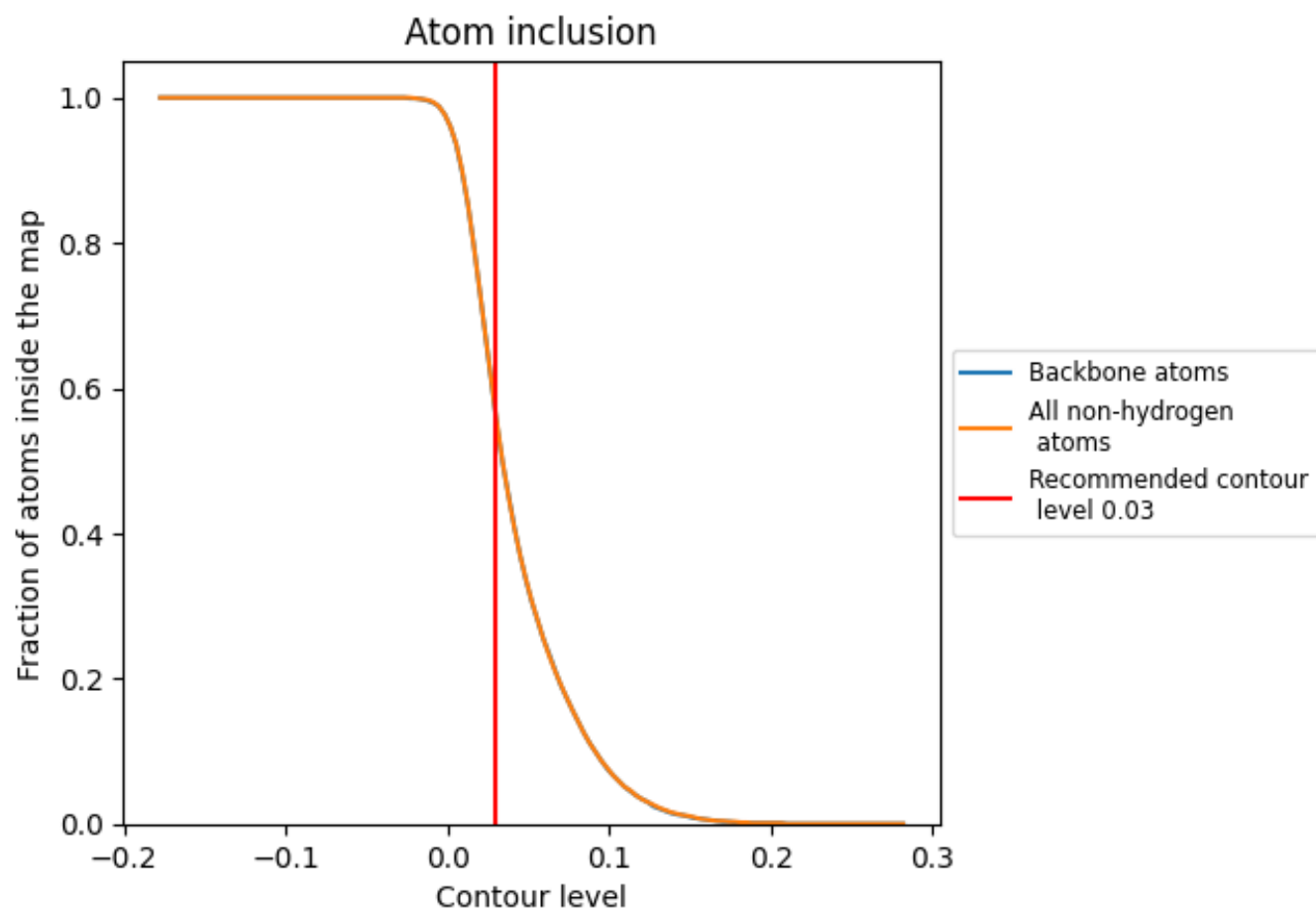
## 9.3 Atom inclusion mapped to coordinate model [i](#)



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 (0.03).



## 9.4 Atom inclusion [i](#)



At the recommended contour level, 56% of all backbone atoms, 56% 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 (0.03) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	<div></div> 0.5600	<div></div> 0.2750
A	<div></div> 0.6340	<div></div> 0.3120
B	<div></div> 0.6310	<div></div> 0.3100
D	<div></div> 0.4590	<div></div> 0.1190
E	<div></div> 0.4640	<div></div> 0.1270
W	<div></div> 0.4600	<div></div> 0.2440
X	<div></div> 0.6180	<div></div> 0.3600
Y	<div></div> 0.4580	<div></div> 0.2470
Z	<div></div> 0.6030	<div></div> 0.3710

1.0

0.0

<0.0