



## wwPDB EM Validation Summary Report ⓘ

Mar 10, 2026 – 04:54 AM UTC

PDB ID : 9EOJ / pdb\_00009eoj  
EMDB ID : EMD-19861  
Title : Vertebrate microtubule-capping gamma-tubulin ring complex  
Authors : Vermeulen, B.J.A.; Pfeffer, S.  
Deposited on : 2024-03-15  
Resolution : 17.00 Å (reported)  
Based on initial models : 6TF9, .

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:

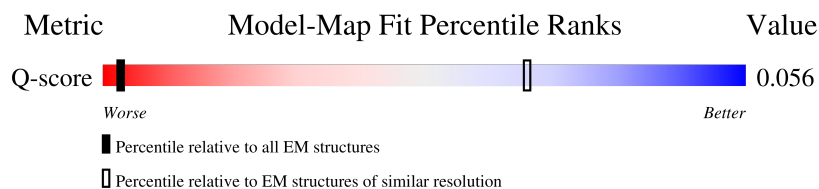
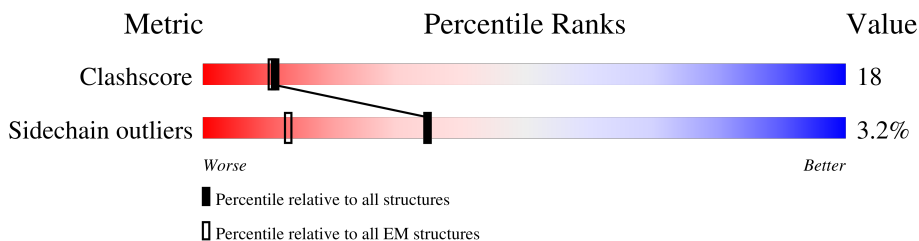
EMDB validation analysis : 0.0.1.dev132  
MolProbity : 4-5-2 with Phenix2.0  
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)  
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)  
MapQ : 1.9.13  
Ideal geometry (proteins)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

# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:  
*ELECTRON MICROSCOPY*

The reported resolution of this entry is 17.00 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	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	38 ( 16.50 - 17.50 )

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	B	72	65% (red), 78% (green), 22% (grey)
1	D	72	31% (red), 68% (green), 28% (grey)
2	Q	906	16% (red), 54% (green), 13% (yellow), 31% (grey)
2	c	906	11% (red), 56% (green), 12% (yellow), 31% (grey)
2	d	906	11% (red), 55% (green), 14% (yellow), 31% (grey)

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Mol	Chain	Length	Quality of chain
2	e	906	14% 67% 12% 21%
2	f	906	40% 55% 12% 31%
3	R	896	20% 46% 15% 38%
3	Y	896	7% 49% 12% 38%
3	Z	896	6% 47% 14% 39%
3	a	896	21% 50% 12% 39%
3	b	896	• 51% 10% 38%
4	S	1698	9% 30% 8% 61%
5	T	451	33% 81% 15% •
5	h	451	28% 80% 16% ••
5	i	451	18% 81% 16% •
5	k	451	12% 80% 17% •
5	l	451	18% 76% 20% ••
5	m	451	25% 74% 22% ••
5	n	451	13% 80% 16% •
5	o	451	12% 80% 16% •
5	p	451	13% 80% 17% •
5	q	451	16% 81% 15% •
5	r	451	20% 80% 16% •
5	s	451	12% 79% 17% •
5	t	451	16% 79% 17% ••
5	w	451	32% 81% 16% •
6	U	1019	5% 45% 11% 44%
7	V	666	15% 64% 20% • 14%
7	W	666	9% 67% 18% • 14%

## 2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 117778 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 Mitotic-spindle organizing protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	B	56	Total	C	N	O	S	0	0
			429	263	73	89	4		
1	D	52	Total	C	N	O	S	0	0
			403	248	71	79	5		

- Molecule 2 is a protein called Gamma-tubulin complex component 3 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	Q	625	Total	C	N	O	S	0	0
			5118	3276	880	936	26		
2	c	625	Total	C	N	O	S	0	0
			5118	3276	880	936	26		
2	d	625	Total	C	N	O	S	0	0
			5118	3276	880	936	26		
2	e	718	Total	C	N	O	S	0	0
			5871	3756	1017	1070	28		
2	f	625	Total	C	N	O	S	0	0
			5118	3276	880	936	26		

- Molecule 3 is a protein called Gamma-tubulin complex component.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	R	553	Total	C	N	O	S	0	0
			4519	2904	742	841	32		
3	Y	553	Total	C	N	O	S	0	0
			4519	2904	742	841	32		
3	Z	551	Total	C	N	O	S	0	0
			4508	2898	740	838	32		
3	a	551	Total	C	N	O	S	0	0
			4503	2894	739	838	32		
3	b	553	Total	C	N	O	S	0	0
			4519	2904	742	841	32		

- Molecule 4 is a protein called Gamma-tubulin complex component 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	S	661	5380	3507	877	968	28	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
S	392	ASP	GLU	conflict	UNP A0A974HT83
S	394	VAL	ILE	conflict	UNP A0A974HT83

- Molecule 5 is a protein called Tubulin gamma-1 chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	T	436	3479	2188	615	662	14	0	0
5	h	436	3479	2188	615	662	14	0	0
5	i	436	3479	2188	615	662	14	0	0
5	k	436	3479	2188	615	662	14	0	0
5	l	436	3479	2188	615	662	14	0	0
5	m	436	3479	2188	615	662	14	0	0
5	n	436	3479	2188	615	662	14	0	0
5	o	436	3479	2188	615	662	14	0	0
5	p	436	3479	2188	615	662	14	0	0
5	q	436	3479	2188	615	662	14	0	0
5	r	436	3479	2188	615	662	14	0	0
5	s	436	3479	2188	615	662	14	0	0
5	t	436	3479	2188	615	662	14	0	0
5	w	436	3479	2188	615	662	14	0	0

- Molecule 6 is a protein called Gamma-tubulin complex component.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	U	569	4679	3041	787	825	26	0	0

- Molecule 7 is a protein called Gamma-tubulin complex component.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	V	571	4635	2993	790	831	21	0	0
7	W	571	4635	2993	790	831	21	0	0

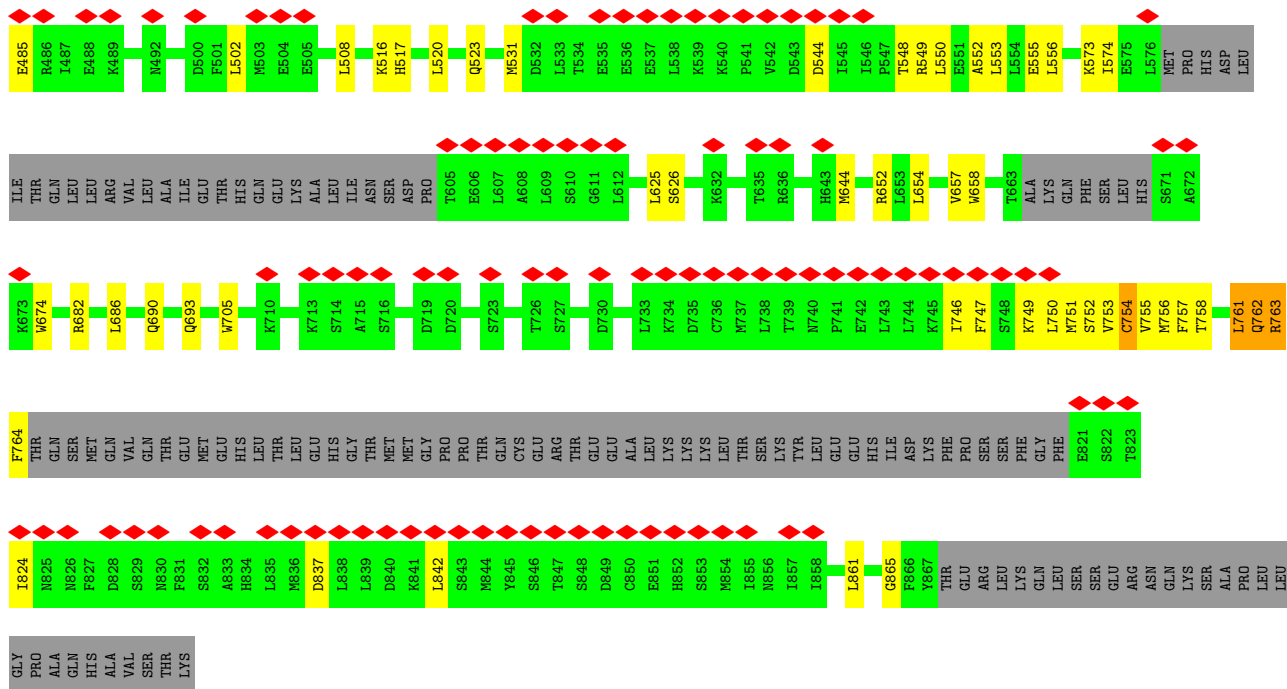




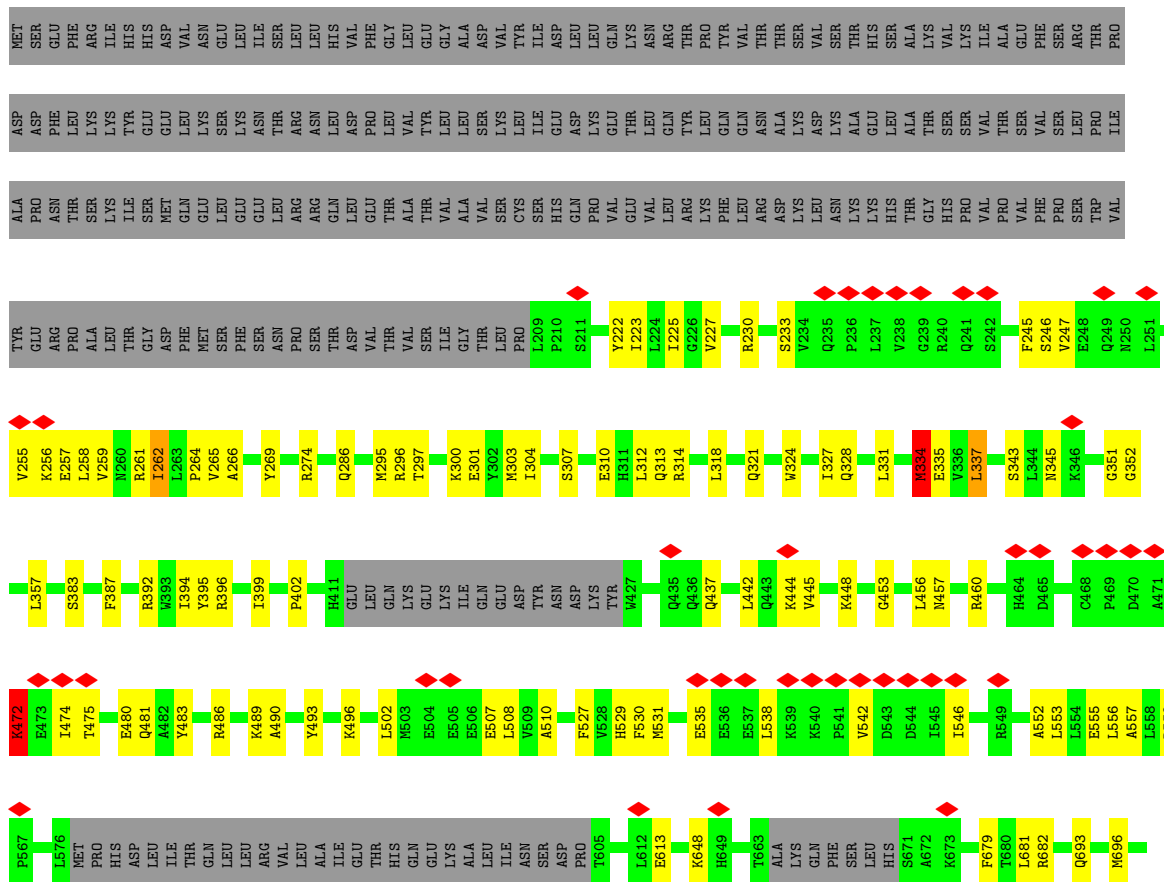




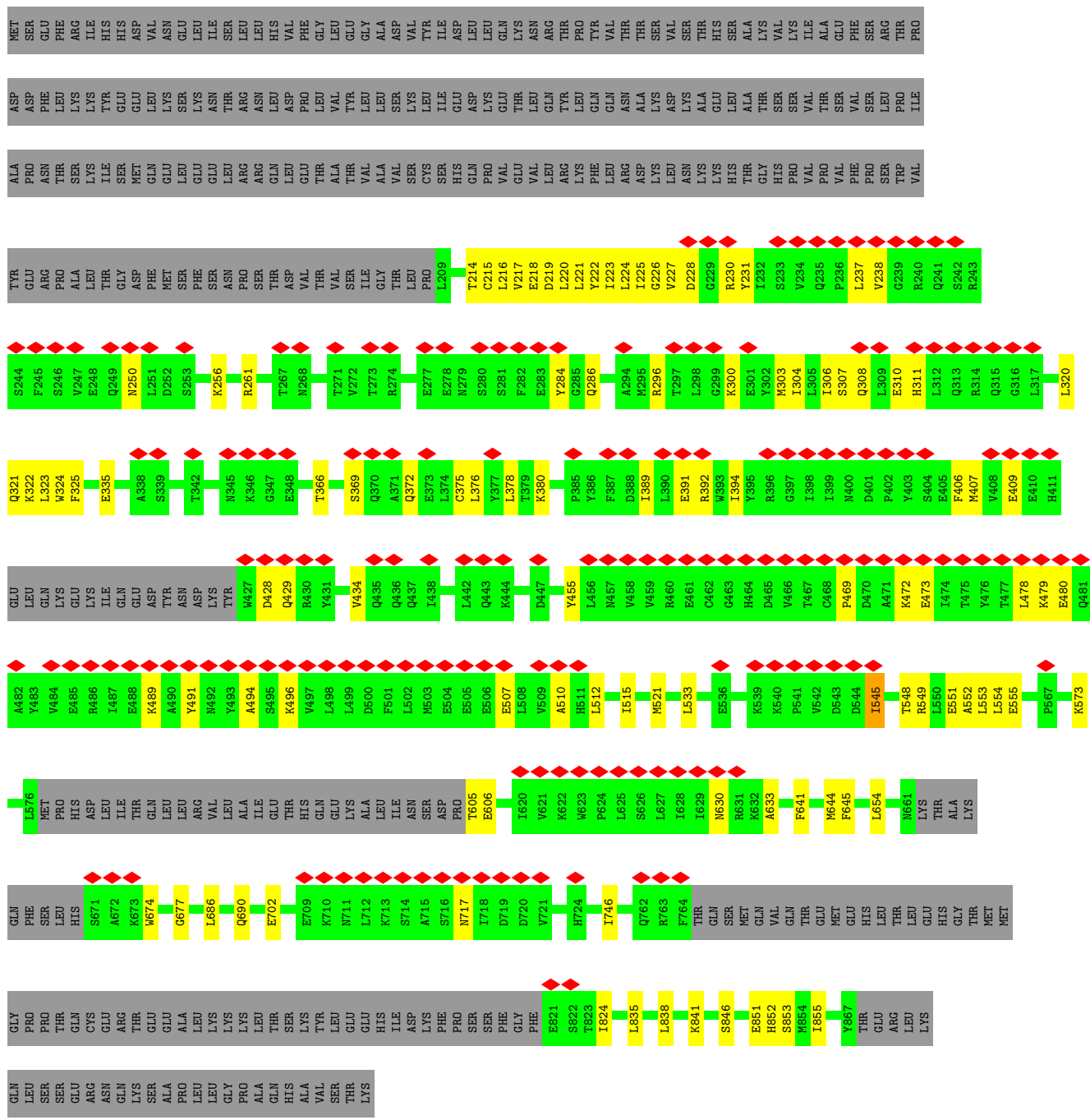




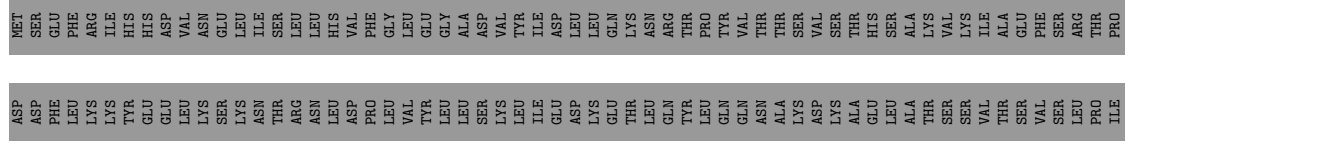
● Molecule 3: Gamma-tubulin complex component



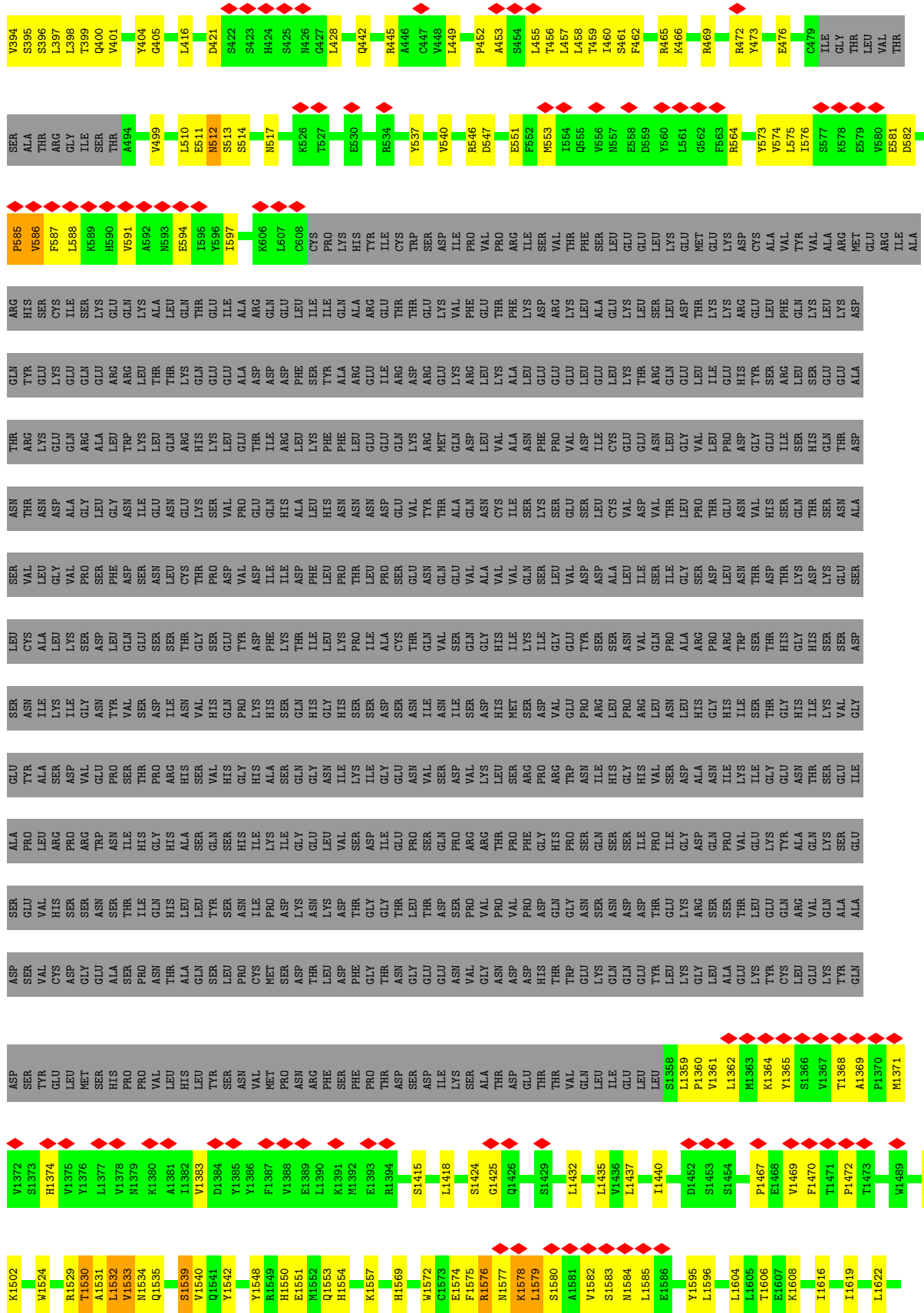


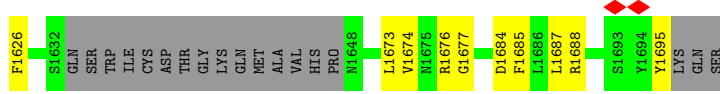


● Molecule 3: Gamma-tubulin complex component

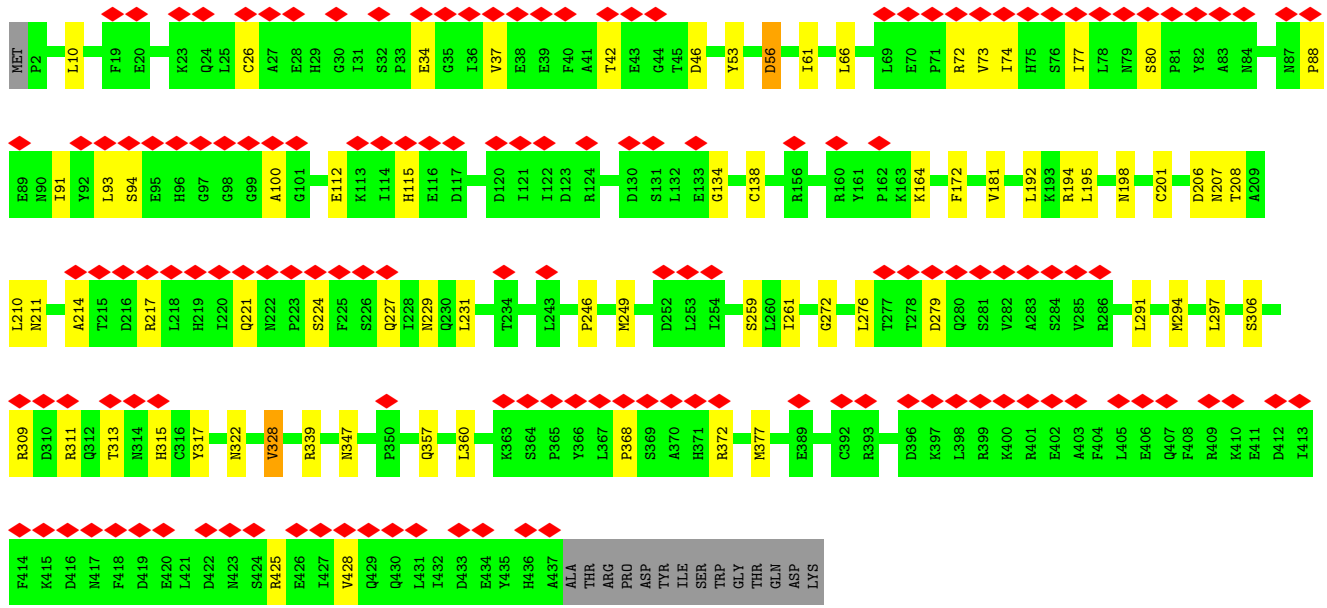
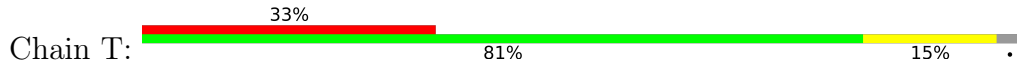




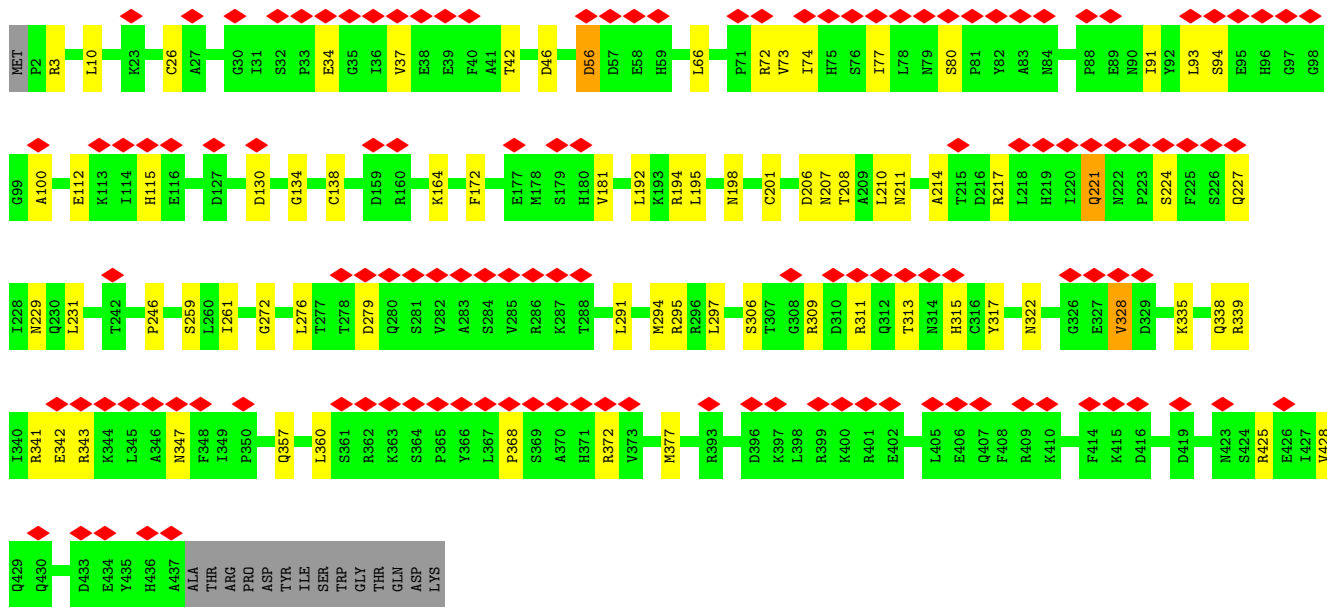
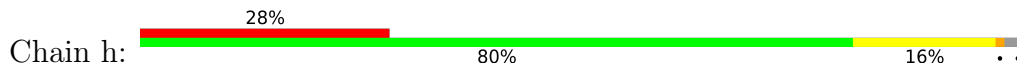




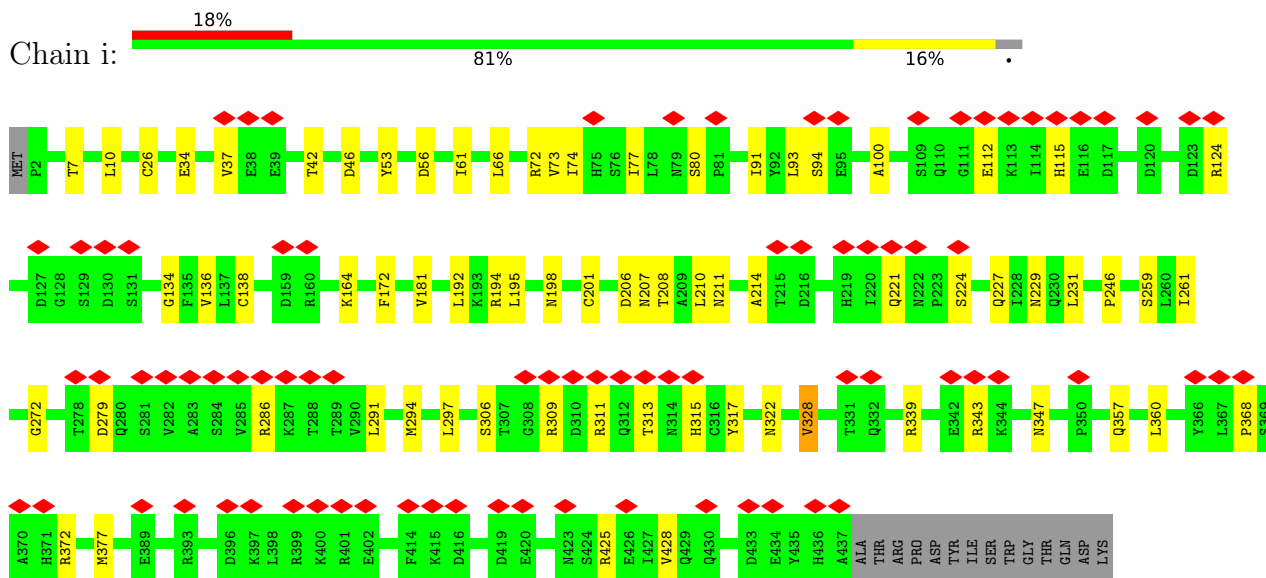
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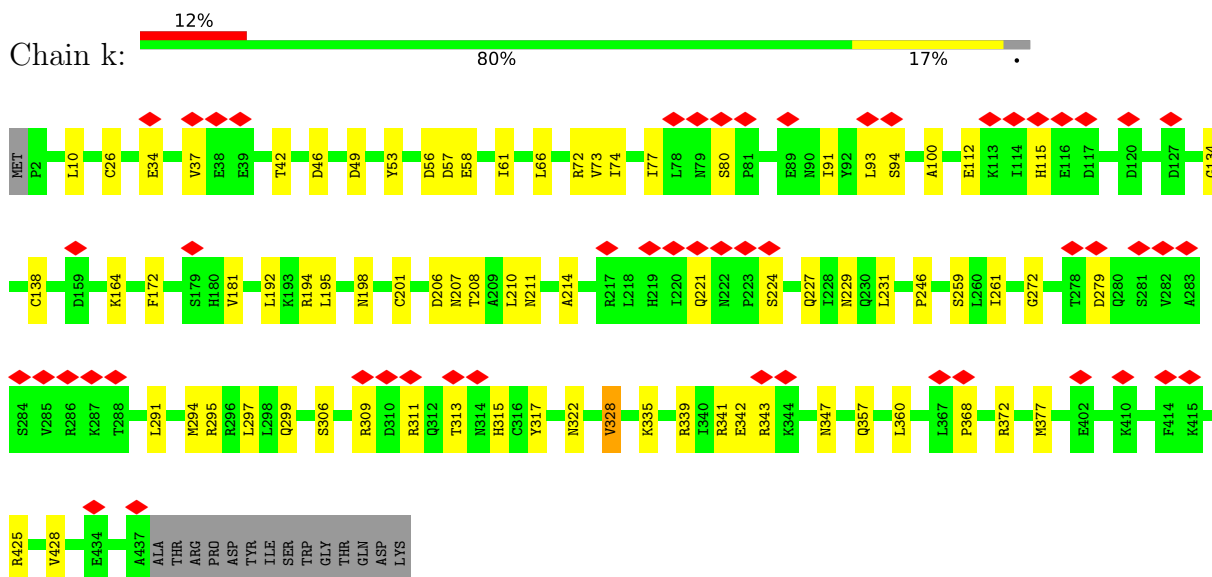
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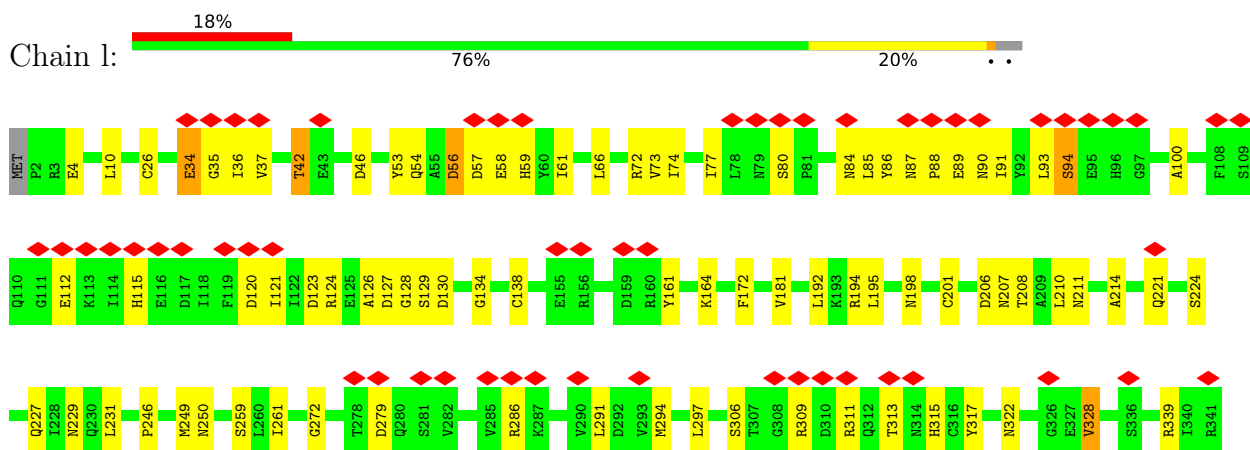
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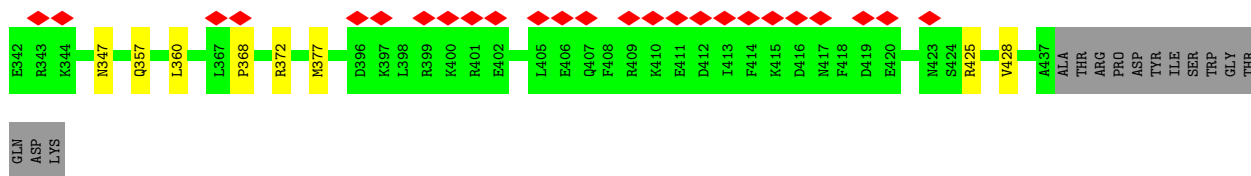


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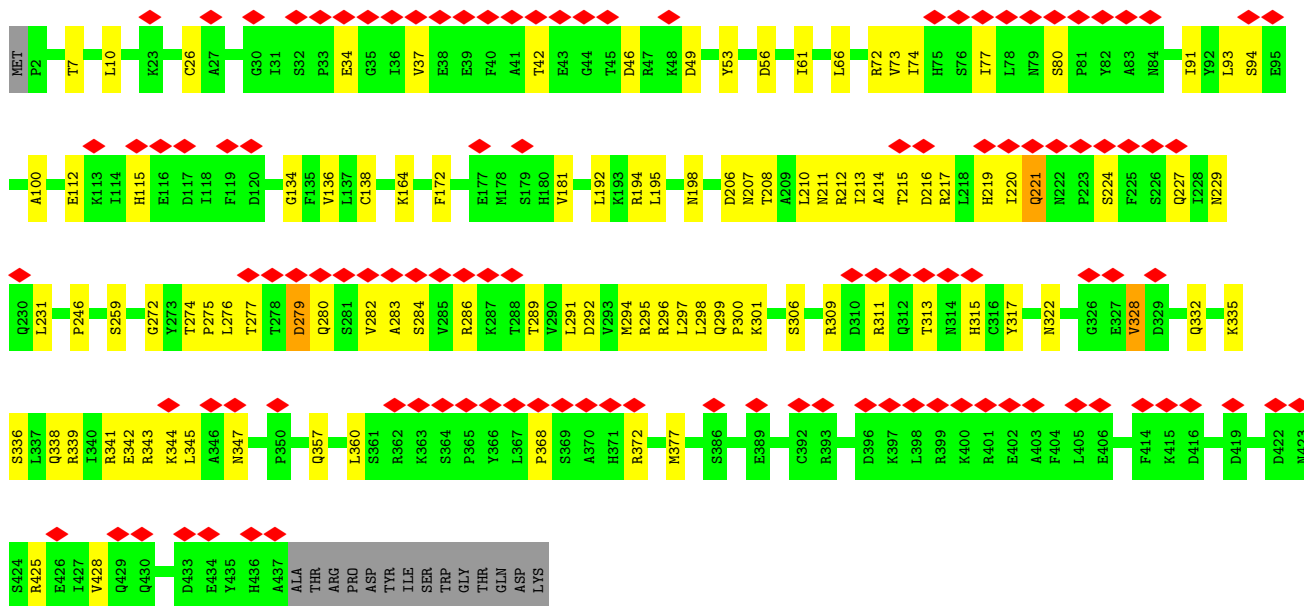
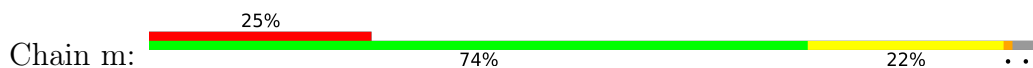


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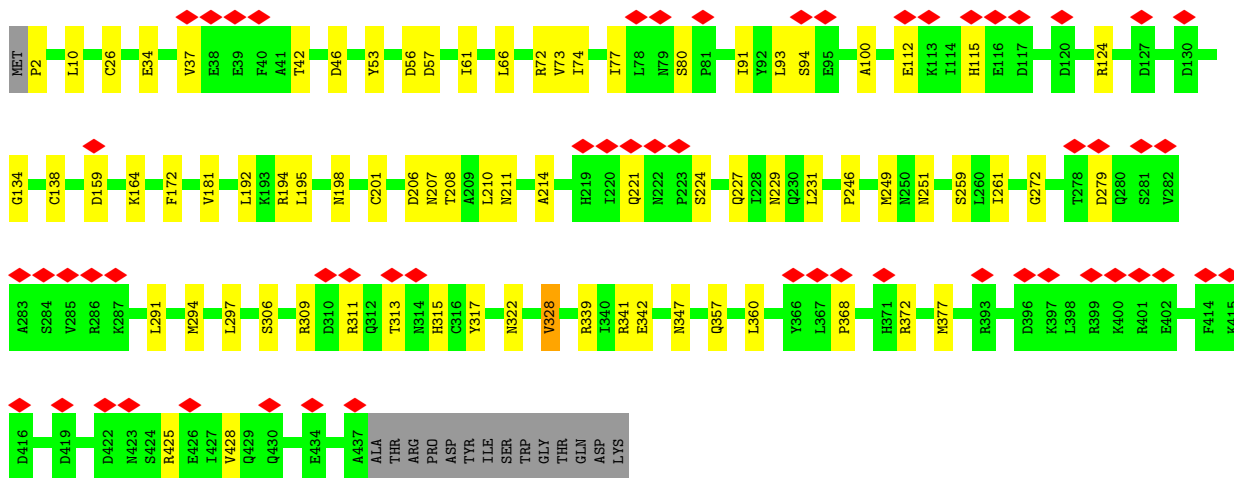
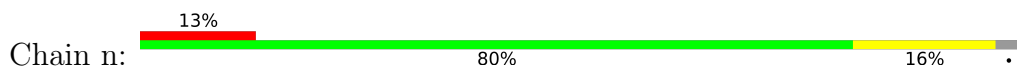




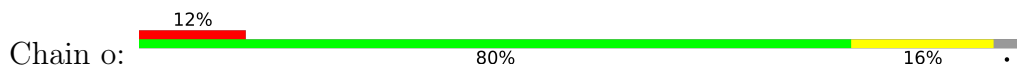
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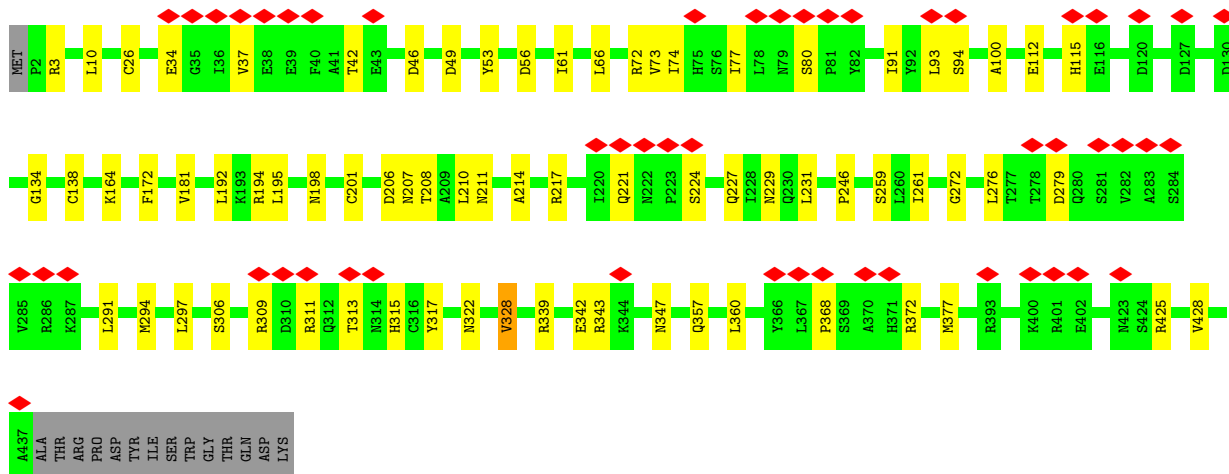


• Molecule 5: Tubulin gamma-1 chain

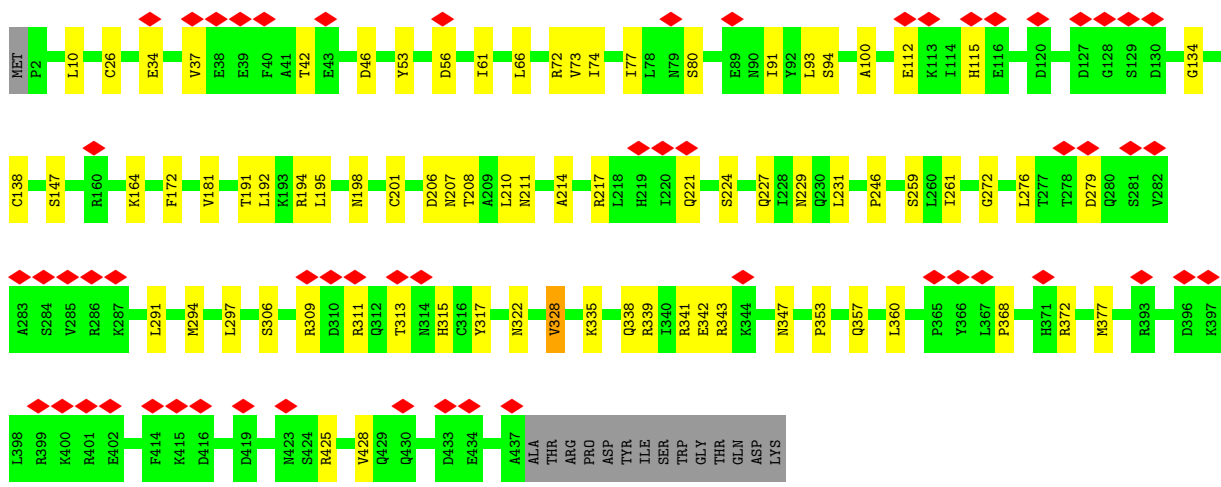
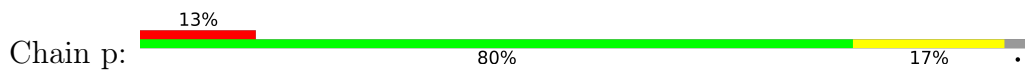


• Molecule 5: Tubulin gamma-1 chain

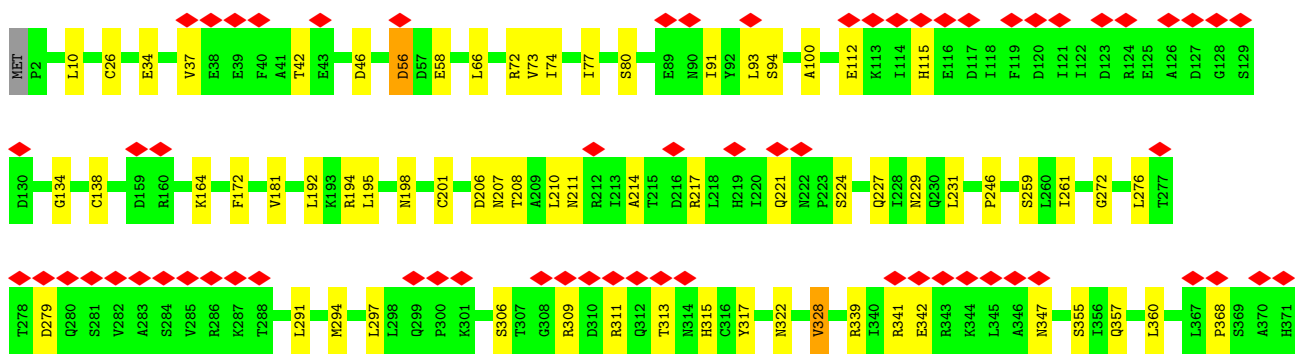
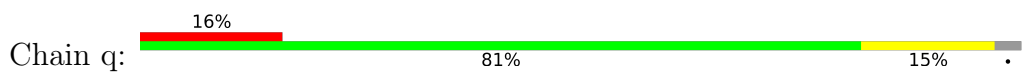


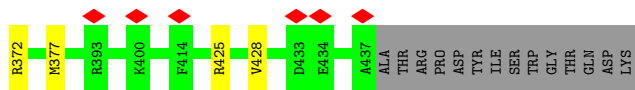


• Molecule 5: Tubulin gamma-1 chain

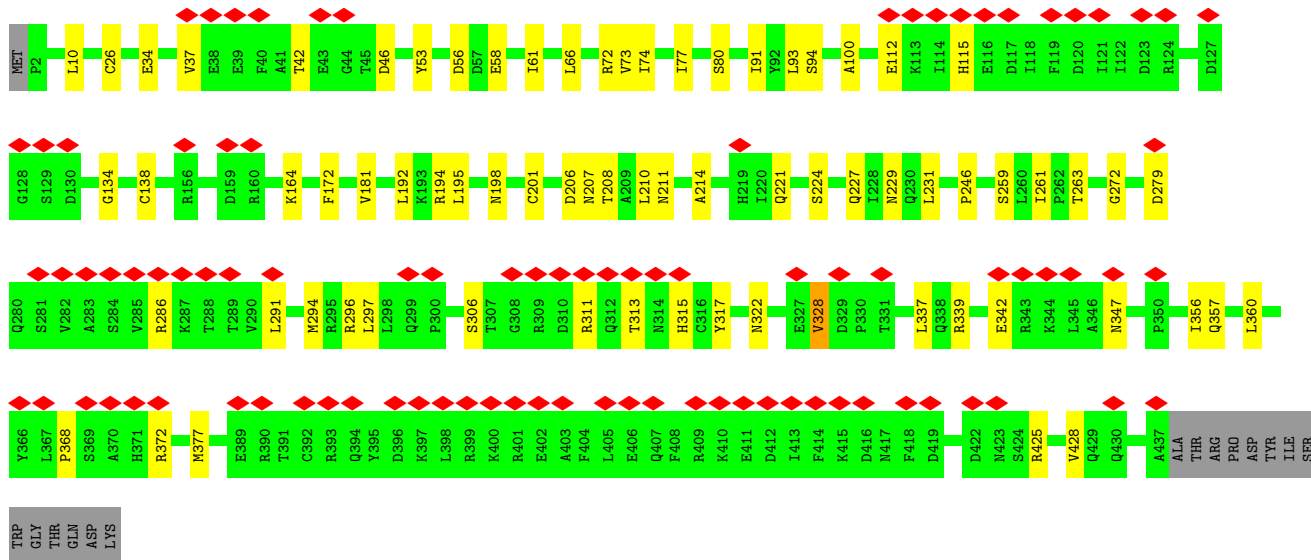
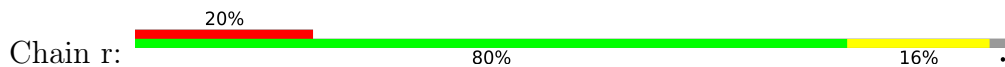


• Molecule 5: Tubulin gamma-1 chain

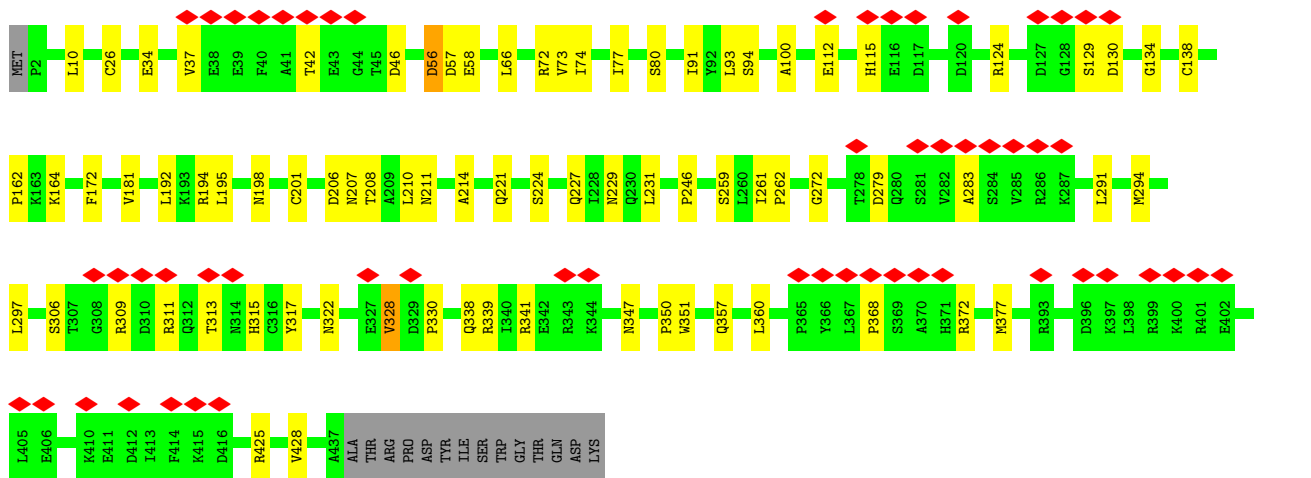
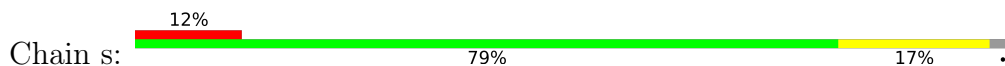




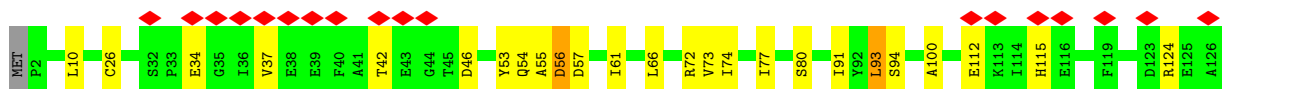
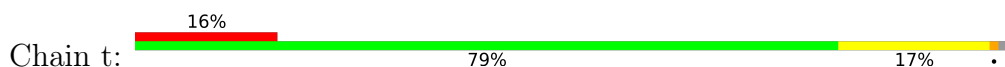
• Molecule 5: Tubulin gamma-1 chain

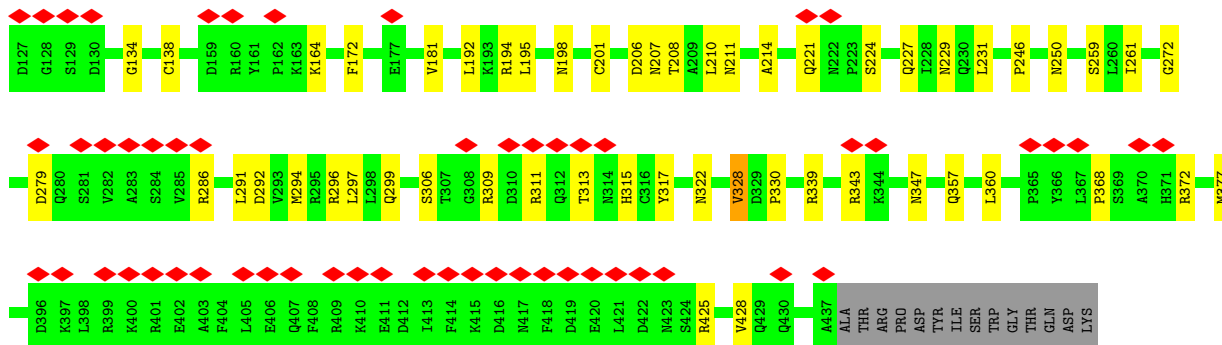


• Molecule 5: Tubulin gamma-1 chain

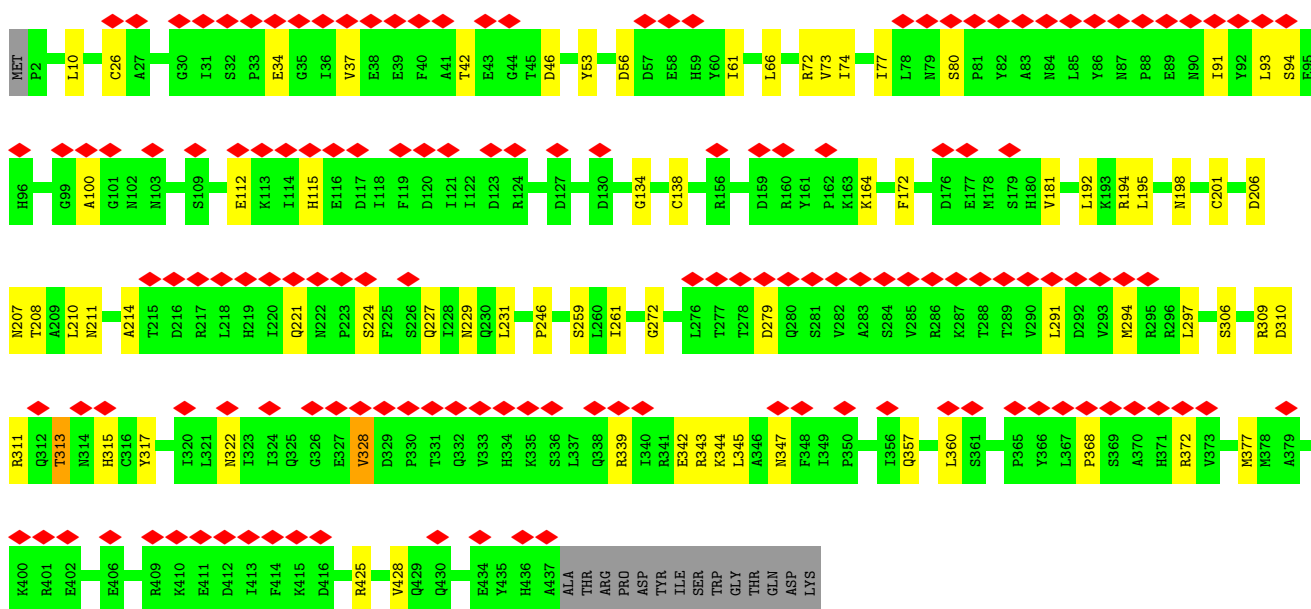
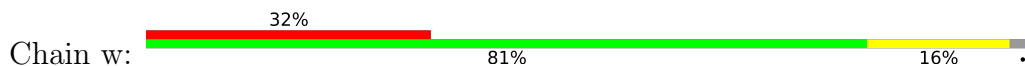


• Molecule 5: Tubulin gamma-1 chain

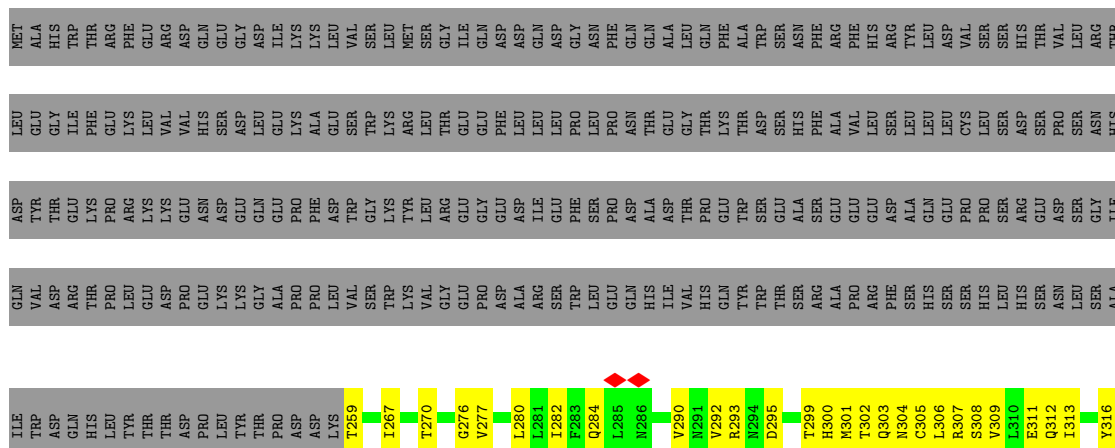
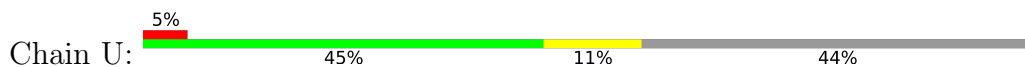




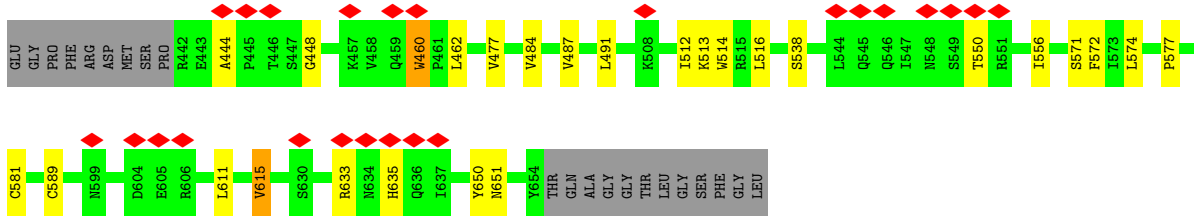
• Molecule 5: Tubulin gamma-1 chain



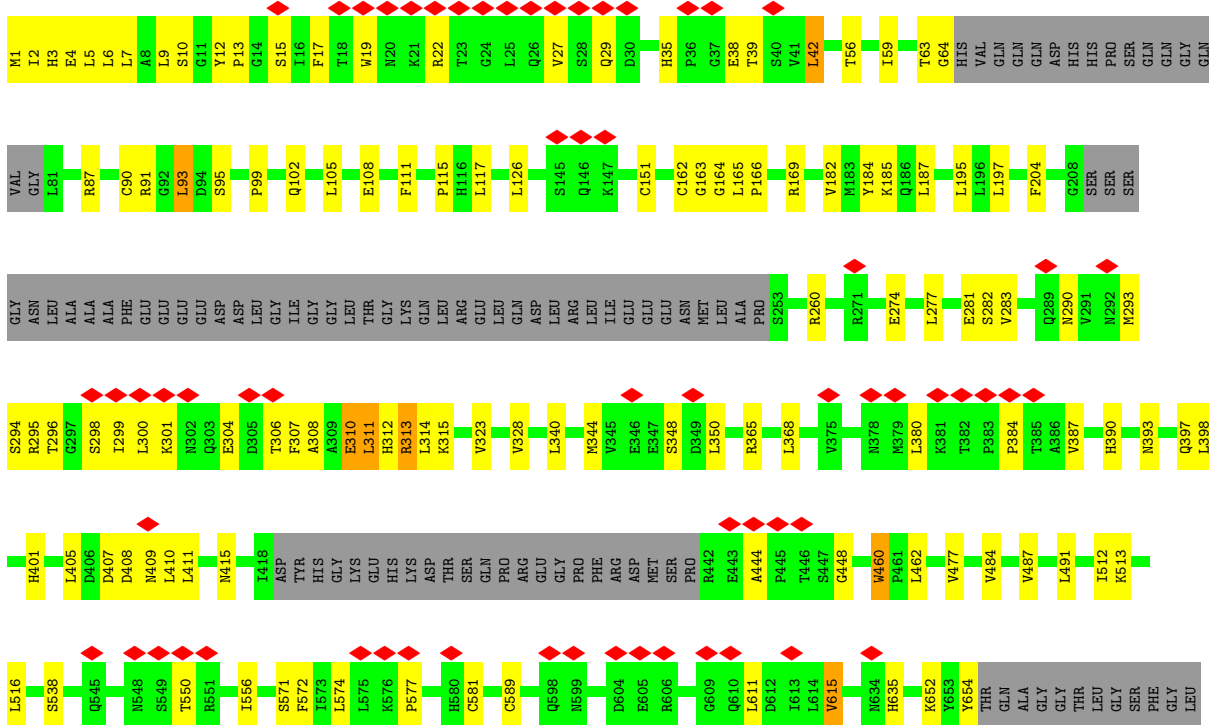
• Molecule 6: Gamma-tubulin complex component







• Molecule 7: Gamma-tubulin complex component



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	8497	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 ( $e^-/\text{\AA}^2$ )	43	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	33000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.050	Depositor
Minimum map value	-0.015	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.006	Depositor
Recommended contour level	0.0192	Depositor
Map size (Å)	513.024, 513.024, 513.024	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	2.004, 2.004, 2.004	Depositor

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

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	B	0.69	0/429	1.22	0/577
1	D	0.72	0/403	1.18	0/541
2	Q	0.32	0/5227	0.67	7/7060 (0.1%)
2	c	0.28	0/5227	0.64	6/7060 (0.1%)
2	d	0.28	0/5227	0.63	6/7060 (0.1%)
2	e	0.36	0/5991	0.73	5/8086 (0.1%)
2	f	0.30	0/5227	0.64	2/7060 (0.0%)
3	R	0.33	0/4614	0.69	4/6236 (0.1%)
3	Y	0.28	0/4614	0.67	3/6236 (0.0%)
3	Z	0.28	0/4603	0.65	2/6221 (0.0%)
3	a	0.25	0/4598	0.61	7/6215 (0.1%)
3	b	0.24	0/4614	0.60	7/6236 (0.1%)
4	S	0.39	0/5500	0.83	12/7442 (0.2%)
5	T	0.21	0/3551	0.51	2/4815 (0.0%)
5	h	0.21	0/3551	0.51	2/4815 (0.0%)
5	i	0.21	0/3551	0.51	2/4815 (0.0%)
5	k	0.21	0/3551	0.51	2/4815 (0.0%)
5	l	0.21	0/3551	0.51	2/4815 (0.0%)
5	m	0.21	0/3551	0.51	2/4815 (0.0%)
5	n	0.21	0/3551	0.51	2/4815 (0.0%)
5	o	0.21	0/3551	0.51	2/4815 (0.0%)
5	p	0.21	0/3551	0.51	2/4815 (0.0%)
5	q	0.21	0/3551	0.51	2/4815 (0.0%)
5	r	0.21	0/3551	0.51	2/4815 (0.0%)
5	s	0.21	0/3551	0.51	2/4815 (0.0%)
5	t	0.21	0/3551	0.51	2/4815 (0.0%)
5	w	0.21	0/3551	0.51	2/4815 (0.0%)
6	U	0.27	0/4778	0.69	5/6459 (0.1%)
7	V	0.30	0/4738	0.69	0/6416
7	W	0.29	0/4738	0.69	0/6416
All	All	0.27	0/120242	0.62	94/162731 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected

by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
2	Q	0	3
2	c	0	2
2	d	0	2
2	e	0	5
2	f	0	3
3	R	0	1
3	Y	0	2
3	Z	0	5
3	a	0	3
3	b	0	2
4	S	0	11
6	U	0	5
7	V	0	3
7	W	0	3
All	All	0	50

There are no bond length outliers.

The worst 5 of 94 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
3	R	277	GLU	CB-CG-CD	7.02	124.53	112.60
3	a	469	PRO	CA-C-N	6.88	134.08	121.70
3	a	469	PRO	C-N-CA	6.88	134.08	121.70
6	U	748	LEU	CA-C-N	6.81	133.96	121.70
6	U	748	LEU	C-N-CA	6.81	133.96	121.70

There are no chirality outliers.

5 of 50 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	Q	271	GLU	Peptide
2	Q	311	SER	Peptide
2	Q	318	LEU	Peptide
3	R	485	GLU	Sidechain
4	S	385	TYR	Peptide

## 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	B	429	0	446	0	0
1	D	403	0	426	2	0
2	Q	5118	0	5088	508	0
2	c	5118	0	5094	463	0
2	d	5118	0	5101	292	0
2	e	5871	0	5878	291	0
2	f	5118	0	5093	379	0
3	R	4519	0	4465	535	0
3	Y	4519	0	4476	301	0
3	Z	4508	0	4455	603	0
3	a	4503	0	4453	383	0
3	b	4519	0	4472	251	0
4	S	5380	0	5402	586	0
5	T	3479	0	3428	50	0
5	h	3479	0	3427	111	0
5	i	3479	0	3426	42	0
5	k	3479	0	3428	107	0
5	l	3479	0	3422	288	0
5	m	3479	0	3411	447	0
5	n	3479	0	3428	56	0
5	o	3479	0	3427	43	0
5	p	3479	0	3423	81	0
5	q	3479	0	3428	45	0
5	r	3479	0	3428	40	0
5	s	3479	0	3426	74	0
5	t	3479	0	3425	110	0
5	w	3479	0	3425	76	0
6	U	4679	0	4784	325	0
7	V	4635	0	4649	552	0
7	W	4635	0	4665	337	0
All	All	117778	0	116899	4251	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 18.

The worst 5 of 4251 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)
6:U:362:TRP:CD1	7:V:166:PRO:HD2	1.14	1.66
6:U:362:TRP:CE2	7:V:166:PRO:HG2	1.27	1.65
3:Z:559:ARG:CB	5:m:291:LEU:HB2	1.22	1.64
3:Z:553:LEU:CD2	5:m:339:ARG:HA	1.24	1.64
2:Q:368:VAL:HG21	3:R:306:ILE:CD1	1.28	1.63

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

There are no protein backbone outliers to report in this entry.

### 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	B	51/62 (82%)	51 (100%)	0	100	100
1	D	48/62 (77%)	48 (100%)	0	100	100
2	Q	539/798 (68%)	524 (97%)	15 (3%)	38	60
2	d	107/798 (13%)	107 (100%)	0	100	100
2	e	643/798 (81%)	638 (99%)	5 (1%)	73	80
2	f	561/798 (70%)	545 (97%)	16 (3%)	37	58
3	R	379/824 (46%)	374 (99%)	5 (1%)	61	74
3	Y	507/824 (62%)	502 (99%)	5 (1%)	68	78
3	Z	258/824 (31%)	258 (100%)	0	100	100
3	a	42/824 (5%)	42 (100%)	0	100	100
4	S	605/1539 (39%)	601 (99%)	4 (1%)	76	81
5	T	387/400 (97%)	369 (95%)	18 (5%)	23	45
5	h	387/400 (97%)	369 (95%)	18 (5%)	23	45

*Continued on next page...*

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
5	i	387/400 (97%)	369 (95%)	18 (5%)	23	45
5	k	387/400 (97%)	369 (95%)	18 (5%)	23	45
5	l	387/400 (97%)	369 (95%)	18 (5%)	23	45
5	m	387/400 (97%)	369 (95%)	18 (5%)	23	45
5	n	387/400 (97%)	369 (95%)	18 (5%)	23	45
5	o	387/400 (97%)	369 (95%)	18 (5%)	23	45
5	p	387/400 (97%)	369 (95%)	18 (5%)	23	45
5	q	387/400 (97%)	369 (95%)	18 (5%)	23	45
5	r	387/400 (97%)	369 (95%)	18 (5%)	23	45
5	s	387/400 (97%)	369 (95%)	18 (5%)	23	45
5	t	387/400 (97%)	369 (95%)	18 (5%)	23	45
5	w	387/400 (97%)	369 (95%)	18 (5%)	23	45
6	U	523/933 (56%)	523 (100%)	0	100	100
7	V	518/595 (87%)	496 (96%)	22 (4%)	26	48
7	W	518/595 (87%)	499 (96%)	19 (4%)	30	51
All	All	10717/15874 (68%)	10374 (97%)	343 (3%)	35	56

5 of 343 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
5	o	279	ASP
5	r	306	SER
5	p	37	VAL
5	q	93	LEU
5	s	221	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 244 such sidechains are listed below:

Mol	Chain	Res	Type
2	f	309	GLN
5	s	322	ASN
5	i	429	GLN
5	s	198	ASN
5	w	197	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](#)

There are no ligands in this entry.

### 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.

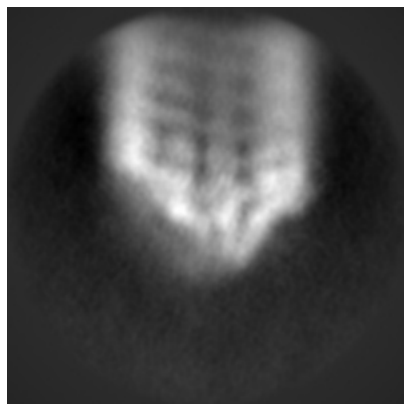
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-19861. These allow visual inspection of the internal detail of the map and identification of artifacts.

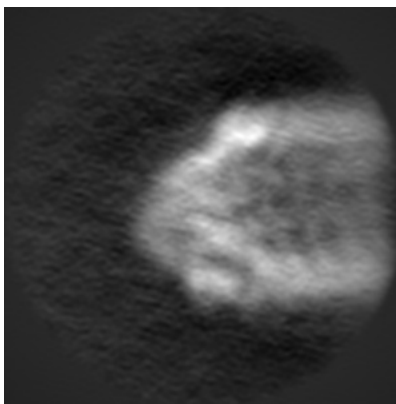
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

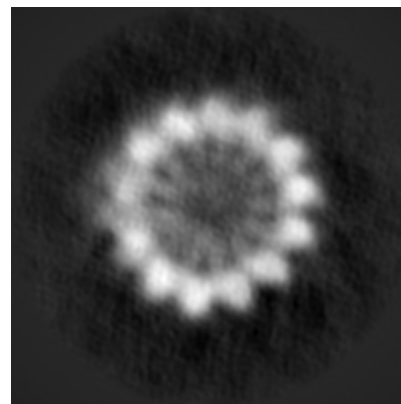
#### 6.1.1 Primary map



X

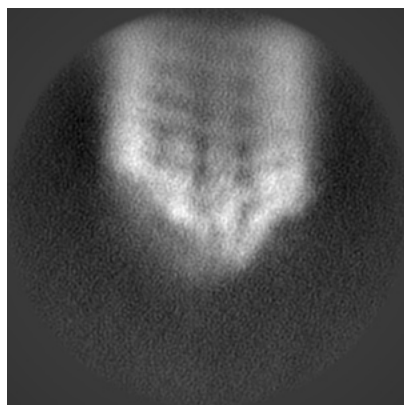


Y

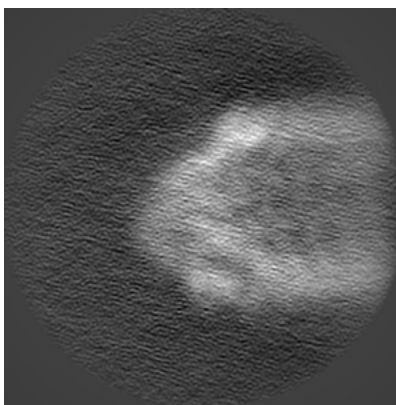


Z

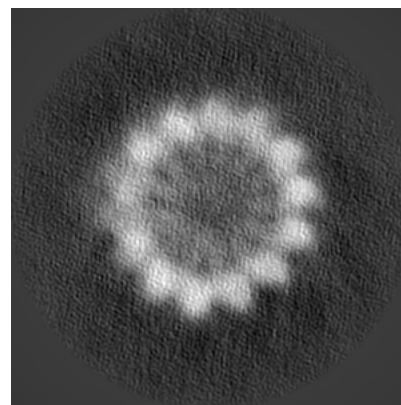
#### 6.1.2 Raw map



X



Y

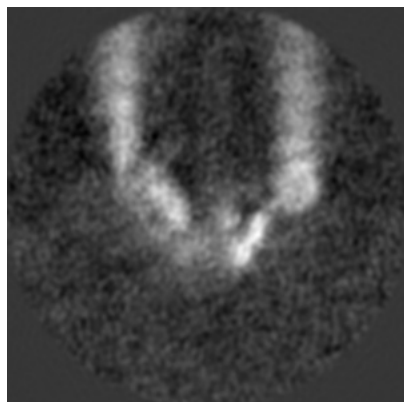


Z

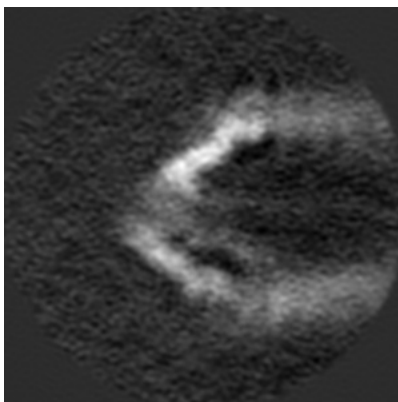
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

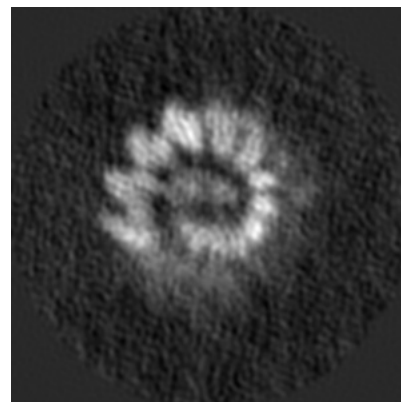
### 6.2.1 Primary map



X Index: 128

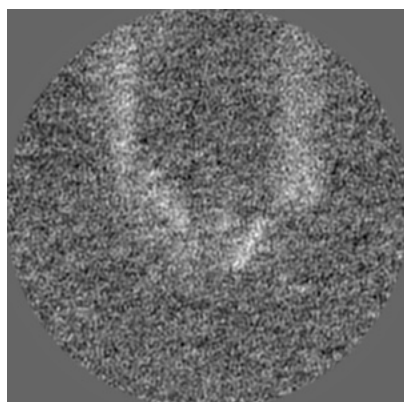


Y Index: 128

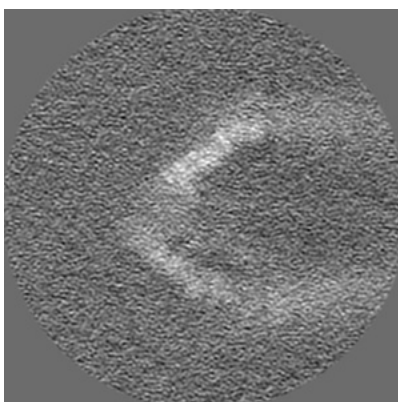


Z Index: 128

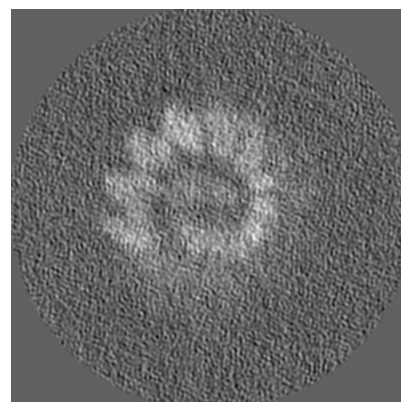
### 6.2.2 Raw map



X Index: 128



Y Index: 128

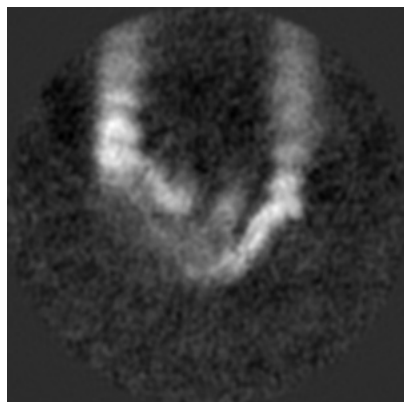


Z Index: 128

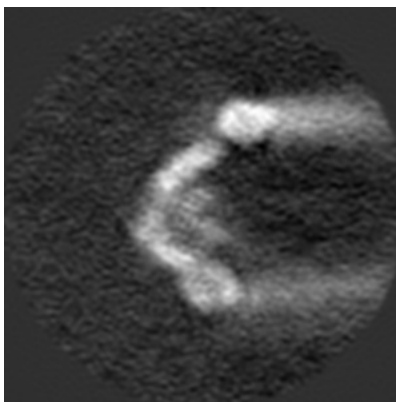
The images above show central slices of the map in three orthogonal directions.

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

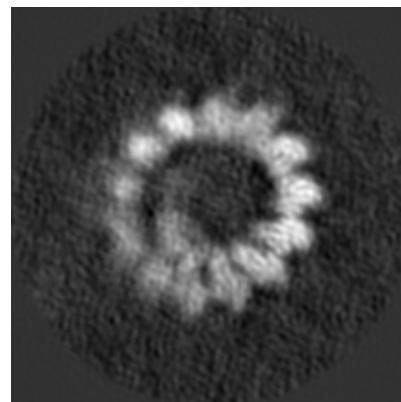
### 6.3.1 Primary map



X Index: 116

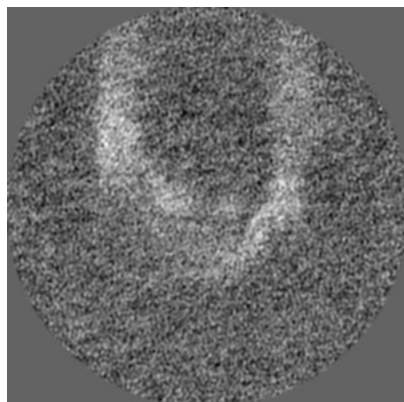


Y Index: 141

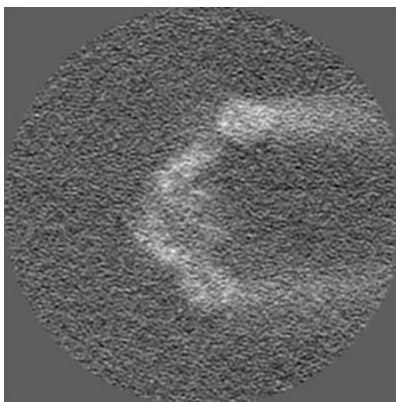


Z Index: 148

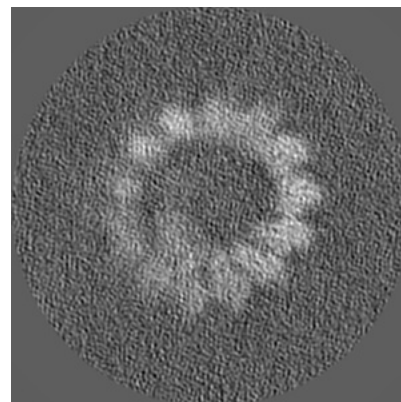
### 6.3.2 Raw map



X Index: 116



Y Index: 140

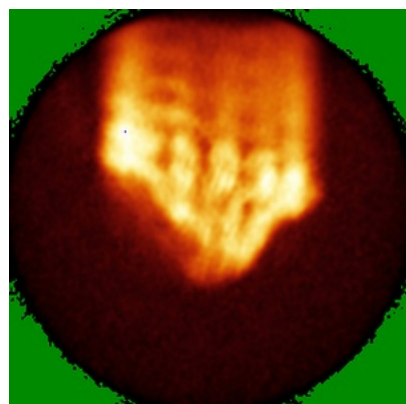


Z Index: 148

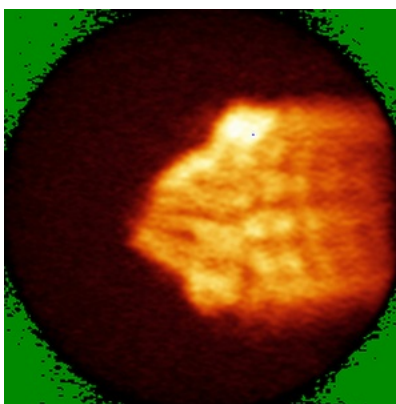
The images above show the largest variance slices of the map in three orthogonal directions.

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

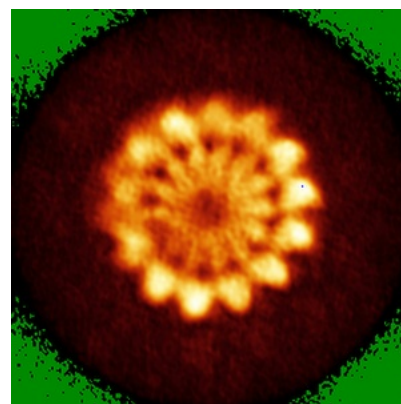
### 6.4.1 Primary map



X

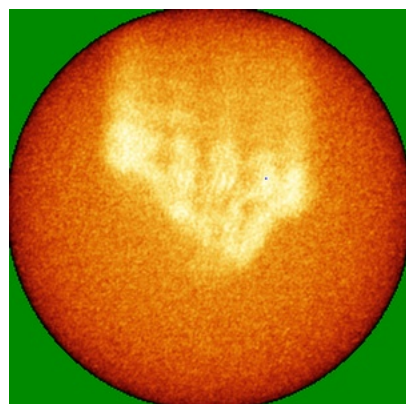


Y

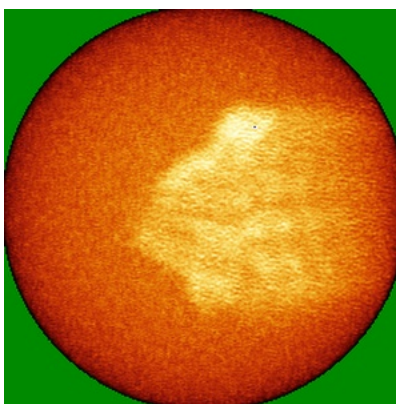


Z

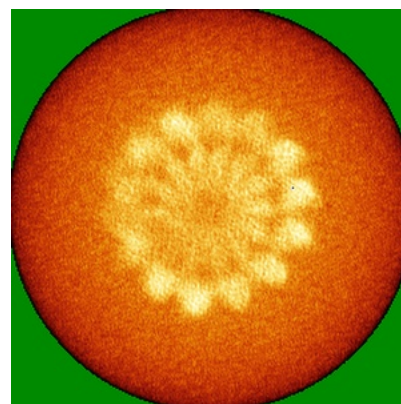
### 6.4.2 Raw map



X



Y



Z

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

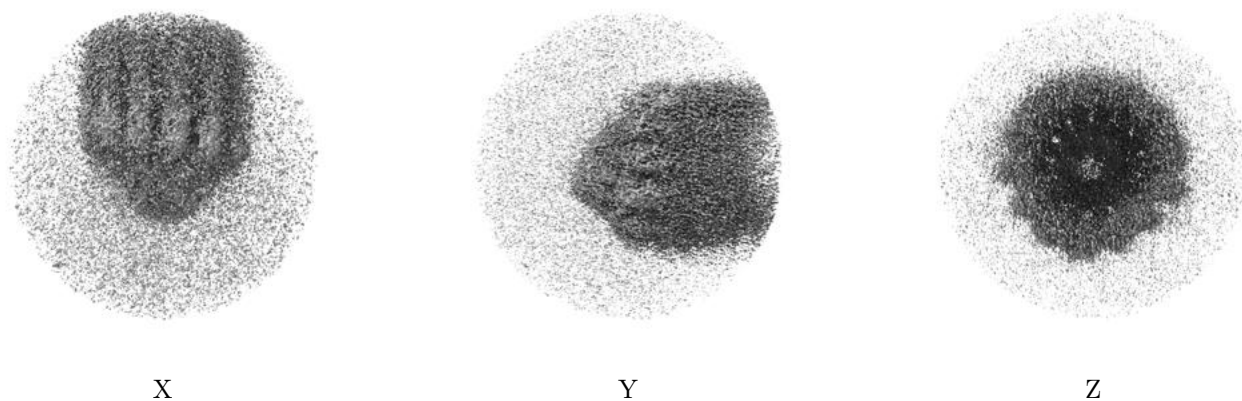
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.0192. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 Raw map



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

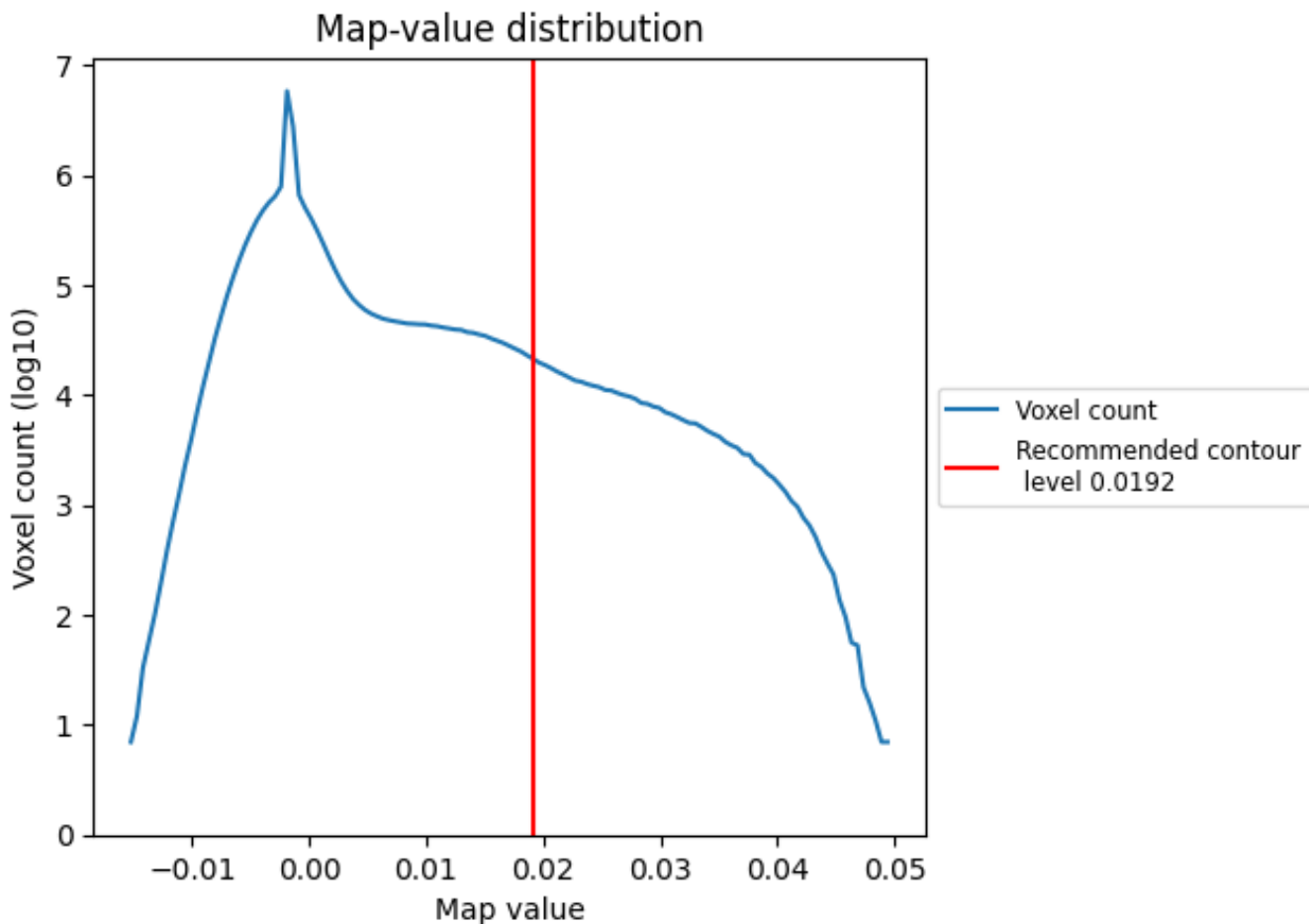
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

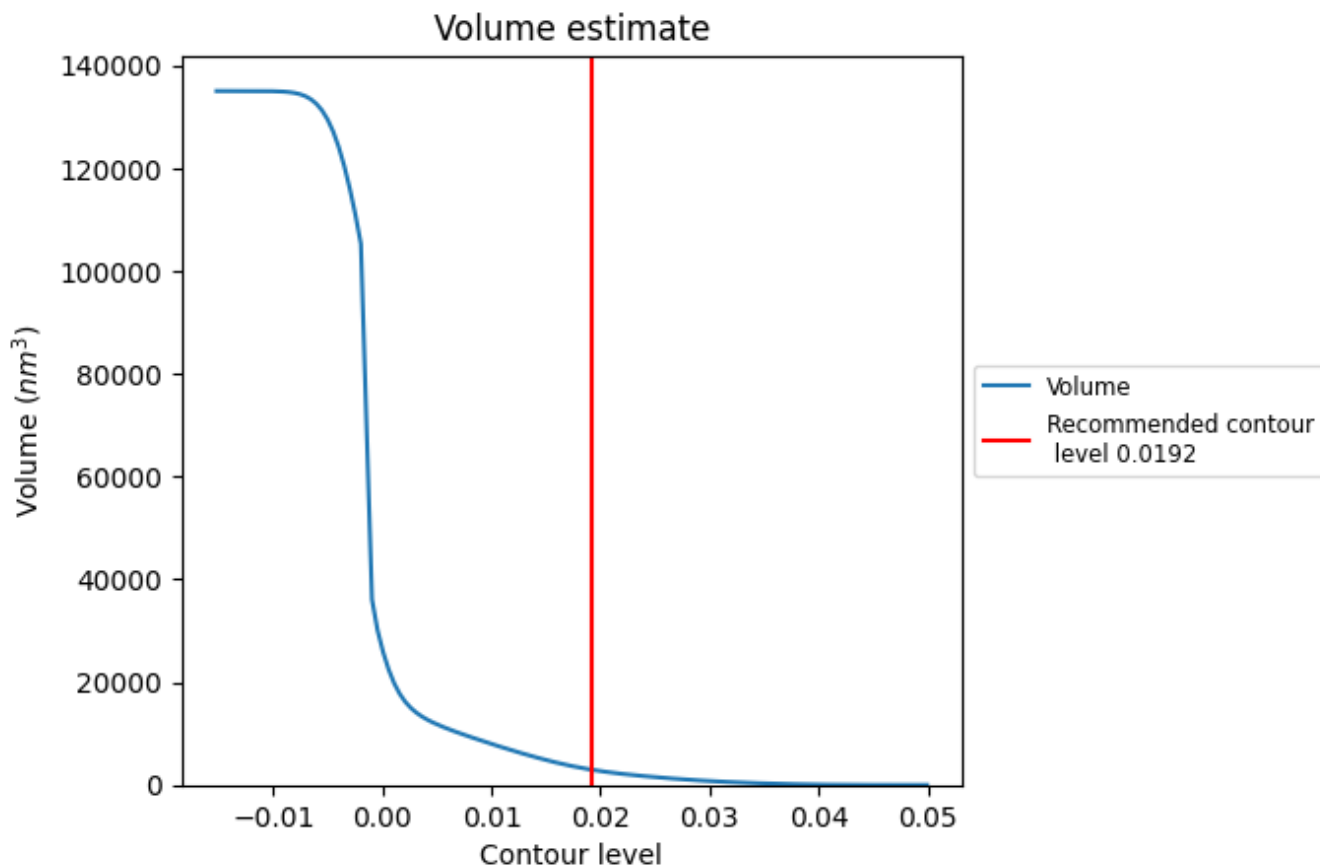
This section contains the results of statistical analysis of the map.

### 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.

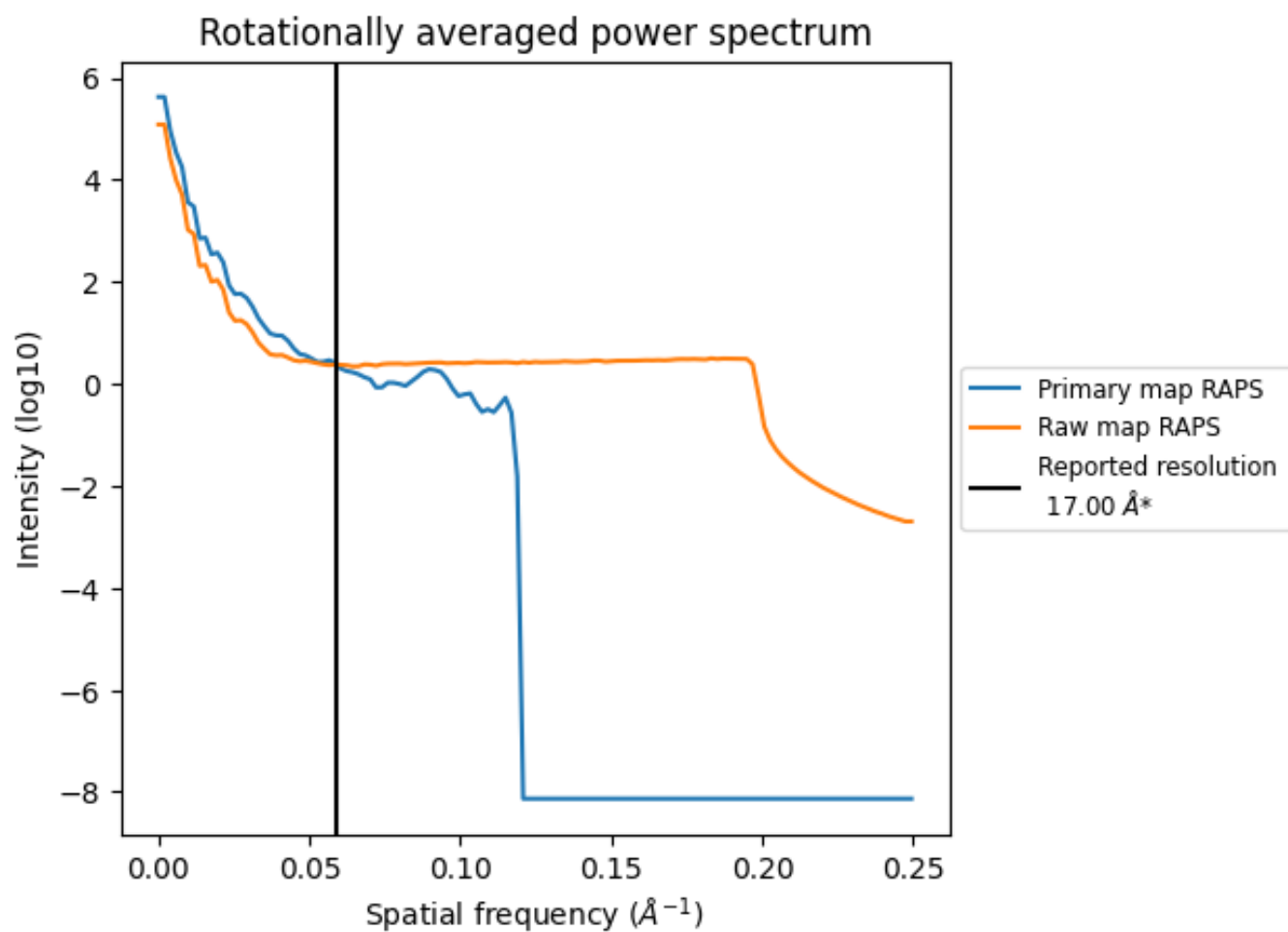
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 2960  $\text{nm}^3$ ; this corresponds to an approximate mass of 2674 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 [\(i\)](#)

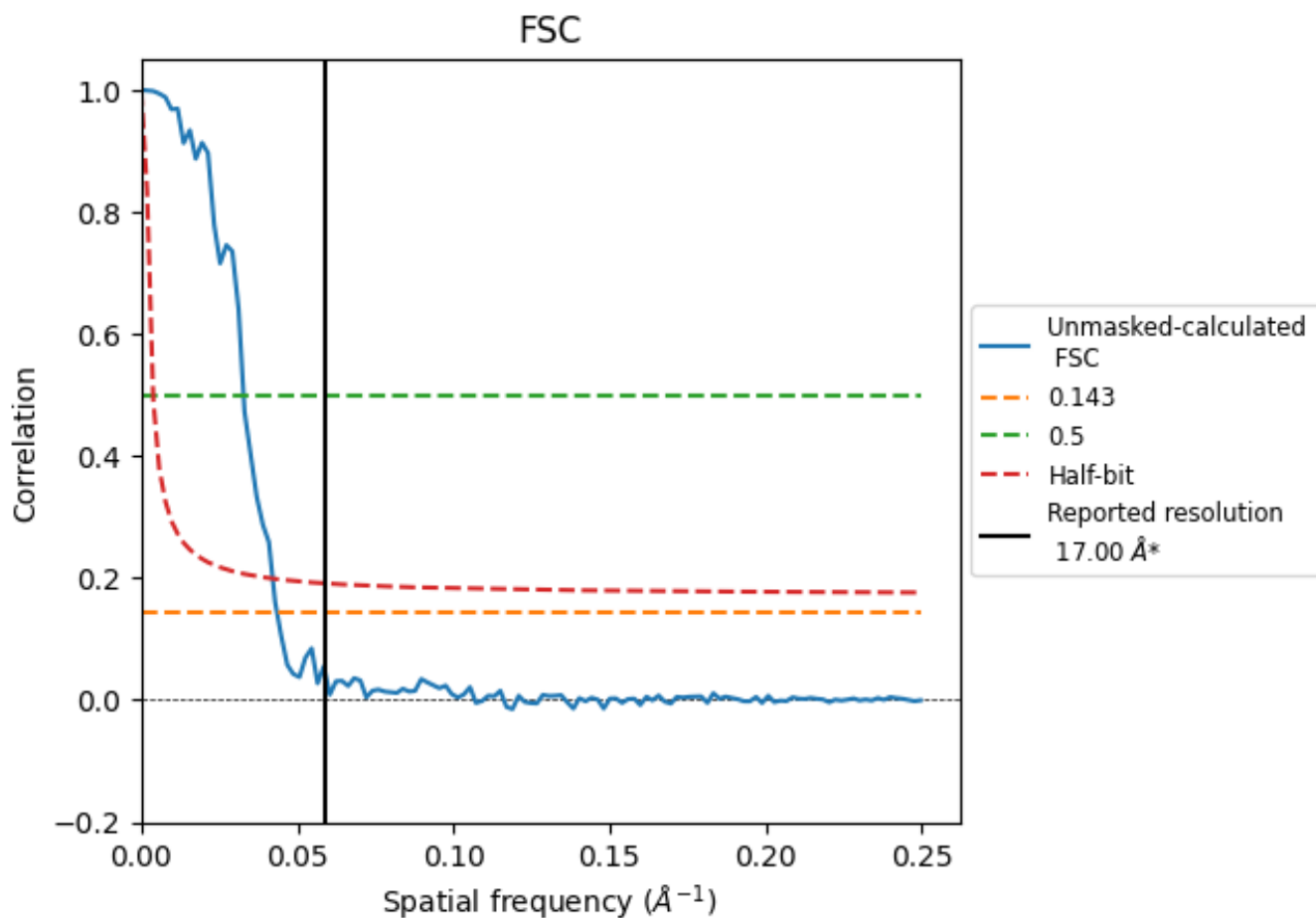


\*Reported resolution corresponds to spatial frequency of 0.059 Å<sup>-1</sup>

## 8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

### 8.1 FSC [i](#)



\*Reported resolution corresponds to spatial frequency of 0.059 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	17.00	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	22.99	30.49	23.75

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 22.99 differs from the reported value 17.0 by more than 10 %

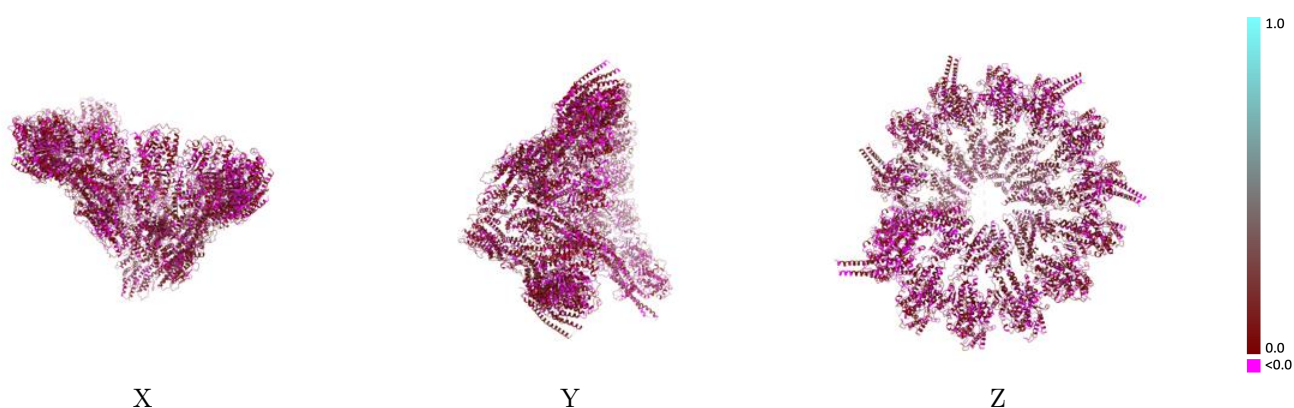
## 9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-19861 and PDB model 9EOJ. Per-residue inclusion information can be found in section 3 on page 7.

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

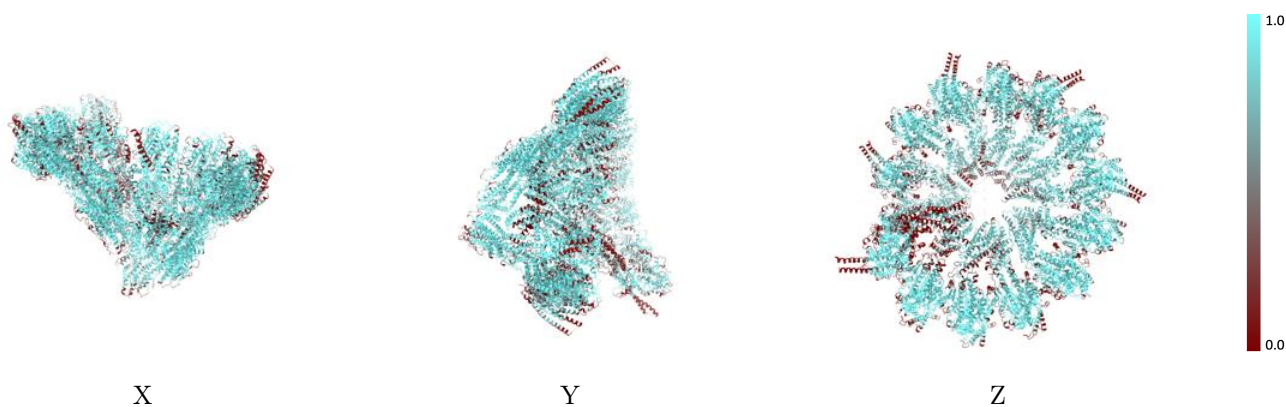
This section was not generated.

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



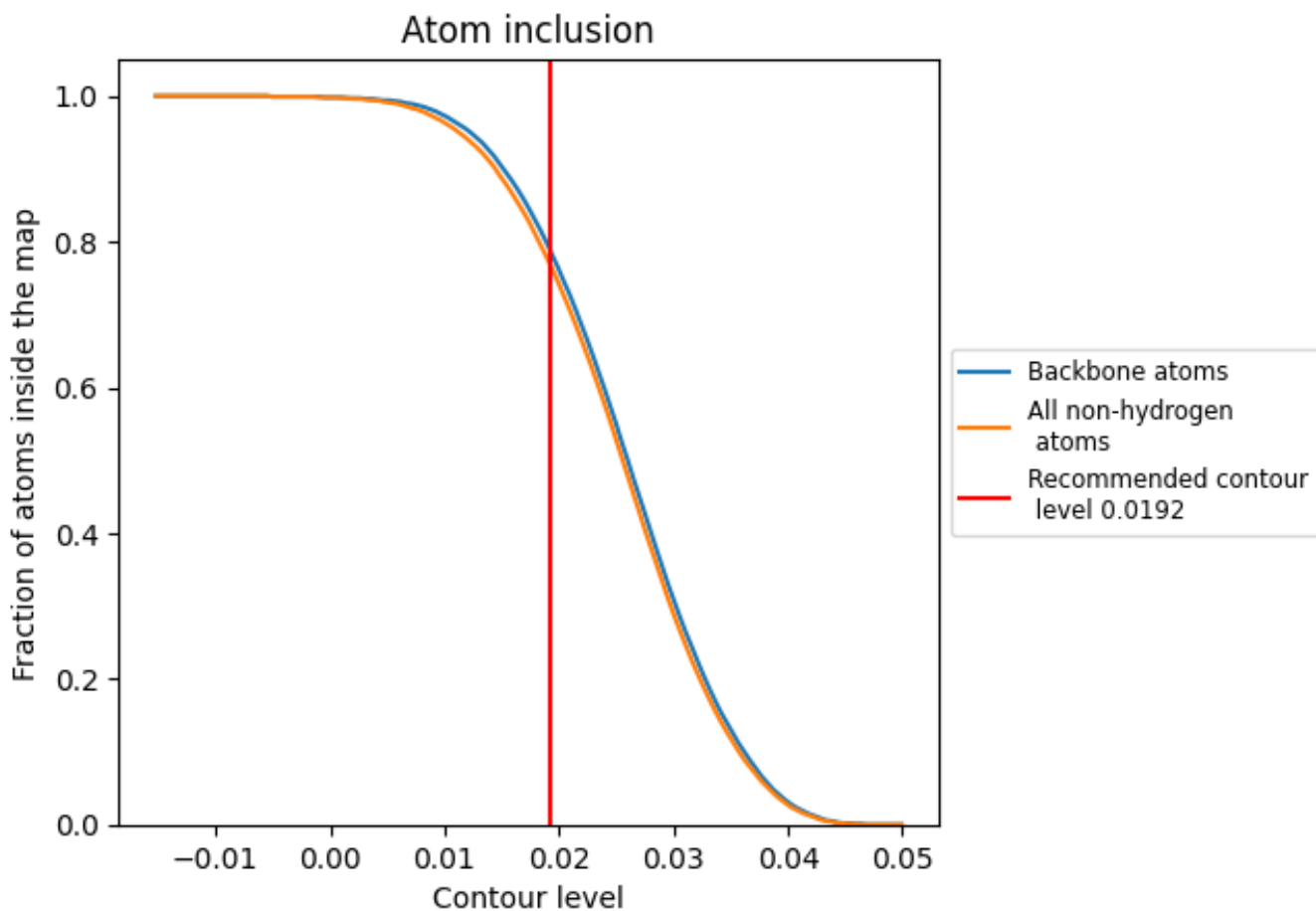
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.0192).































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 79% 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 (0.0192) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7700	 0.0560
B	 0.1400	 0.0890
D	 0.4560	 0.1070
Q	 0.7500	 0.0820
R	 0.6620	 0.0520
S	 0.7330	 0.0660
T	 0.6270	 0.0240
U	 0.8740	 0.0800
V	 0.7910	 0.0650
W	 0.8610	 0.0690
Y	 0.8590	 0.0850
Z	 0.8680	 0.0680
a	 0.6350	 0.0470
b	 0.9290	 0.0790
c	 0.8220	 0.0780
d	 0.8240	 0.0700
e	 0.8110	 0.0690
f	 0.4130	 0.0400
h	 0.6840	 0.0400
i	 0.7770	 0.0360
k	 0.8470	 0.0450
l	 0.7700	 0.0330
m	 0.7130	 0.0330
n	 0.8490	 0.0490
o	 0.8640	 0.0440
p	 0.8400	 0.0440
q	 0.8140	 0.0520
r	 0.7550	 0.0380
s	 0.8440	 0.0350
t	 0.8060	 0.0360
w	 0.6480	 0.0250

