W O R L D W I D E

wwPDB

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

Full wwPDB EM Validation Report (i)

Sep 28, 2024 – 07:52 am BST

PDB ID	:	9G3Z
EMDB ID	:	EMD-51019
Title	:	Structure of the Open gamma-Tubulin Ring Complex from Pig Brain
Authors	:	Munoz-Hernandez, H.; Wieczorek, M.
Deposited on	:	2024-07-12
Resolution	:	4.30 Å(reported)

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

We welcome your comments at *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 (i) symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references (i)) were used in the production of this report:
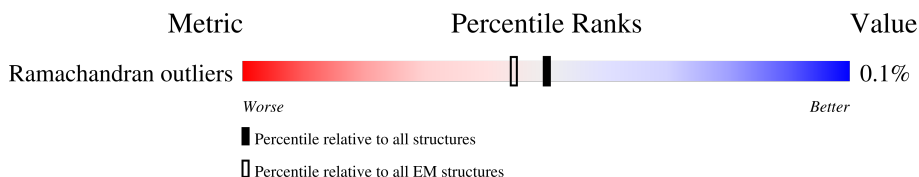
EMDB validation analysis	:	0.0.1.dev113
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

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 4.30 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.
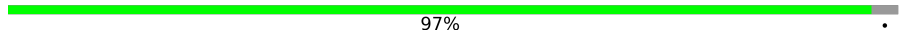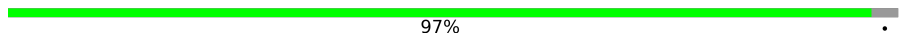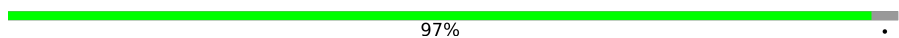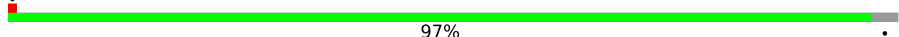
Metric	Percentile Ranks	Value
Ramachandran outliers		0.1%

Worse   *Better*

▮ Percentile relative to all structures

▯ Percentile relative to all EM structures
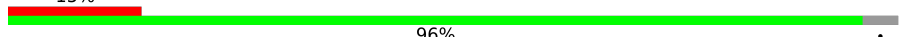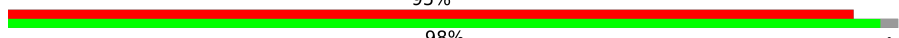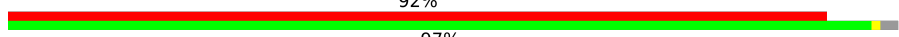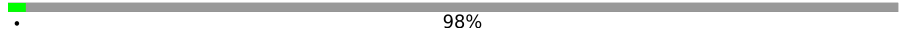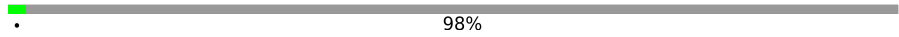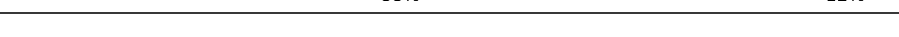
Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	207382	16835

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	O	79	62% 85% 15%
1	P	79	84% • 15%
1	Q	79	81% 19%
2	Y	155	33% 67%
3	a	451	98% •
3	b	451	98% •
3	c	451	98% •
3	d	451	94% 6%
3	e	451	96% •
3	f	451	96% •
3	g	451	96% •

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Mol	Chain	Length	Quality of chain
3	h	451	97%
3	i	451	97%
3	j	451	97%
3	k	451	97%
3	l	451	15% 96%
3	m	451	95% 98%
3	n	451	92% 97%
4	w	1663	98%
4	x	1663	98%
5	B	910	68% 32%
5	D	910	68% 32%
5	F	910	68% 32%
5	H	910	81% 19%
5	N	910	38% 77% 22%
6	A	905	74% 26%
6	C	905	74% 26%
6	E	905	74% 26%
6	G	905	74% 26%
6	M	905	14% 86% 14%
7	L	1715	45% 55%
8	I	667	88% 12%
8	K	667	88% 12%
9	J	1042	64% 36%

2   Entry composition ⓘ

There are 9 unique types of molecules in this entry. The entry contains 113079 atoms, of which 34747 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
1	O	67	Total 497	C 199	H 164	N 67	O 67	0	0
1	P	67	Total 497	C 199	H 164	N 67	O 67	0	0
1	Q	64	Total 464	C 190	H 146	N 64	O 64	0	0

- Molecule 2 is a protein called Mitotic-spindle organizing protein 2A isoform X4.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	Y	51	Total 379	C 150	H 127	N 51	O 51	0	0

- Molecule 3 is a protein called Tubulin gamma chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	a	444	Total 3161	C 1306	H 967	N 444	O 444	0	0
3	m	444	Total 3161	C 1306	H 967	N 444	O 444	0	0
3	b	442	Total 3146	C 1299	H 963	N 442	O 442	0	0
3	c	440	Total 3129	C 1293	H 956	N 440	O 440	0	0
3	d	426	Total 3030	C 1252	H 926	N 426	O 426	0	0
3	e	432	Total 3074	C 1270	H 940	N 432	O 432	0	0
3	f	433	Total 3081	C 1273	H 942	N 433	O 433	0	0
3	g	433	Total 3081	C 1273	H 942	N 433	O 433	0	0
3	h	439	Total 3122	C 1291	H 953	N 439	O 439	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
3	i	438	Total 3115	C 1288	H 951	N 438	O 438	0	0
3	n	442	Total 3146	C 1299	H 963	N 442	O 442	0	0
3	k	438	Total 3115	C 1288	H 951	N 438	O 438	0	0
3	j	439	Total 3122	C 1292	H 952	N 439	O 439	0	0
3	l	435	Total 3094	C 1279	H 945	N 435	O 435	0	0

- Molecule 4 is a protein called CDK5 regulatory subunit-associated protein 2.

Mol	Chain	Residues	Atoms				AltConf	Trace
4	w	33	Total 230	C 99	H 65	N 33	O 33	0	0
4	x	34	Total 237	C 102	H 67	N 34	O 34	0	0

- Molecule 5 is a protein called Gamma-tubulin complex component 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	N	707	Total 5082	C 2092	H 1576	N 707	O 707	0	0
5	B	621	Total 4466	C 1839	H 1385	N 621	O 621	0	0
5	H	739	Total 5322	C 2189	H 1655	N 739	O 739	0	0
5	D	621	Total 4466	C 1839	H 1385	N 621	O 621	0	0
5	F	621	Total 4466	C 1839	H 1385	N 621	O 621	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
6	M	782	Total 5606	C 2316	H 1726	N 782	O 782	0	0
6	A	669	Total 4792	C 1983	H 1471	N 669	O 669	0	0
6	C	669	Total 4792	C 1983	H 1471	N 669	O 669	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
6	E	669	Total 4792	C 1983	H 1471	N 669	O 669	0	0
6	G	669	Total 4792	C 1983	H 1471	N 669	O 669	0	0

- Molecule 7 is a protein called Tubulin gamma complex associated protein 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	L	773	Total 5548	C 2269	H 1733	N 773	O 773	0	0

- Molecule 8 is a protein called Gamma-tubulin complex component.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	I	587	Total 4180	C 1732	H 1274	N 587	O 587	0	0
8	K	587	Total 4180	C 1732	H 1274	N 587	O 587	0	0

- Molecule 9 is a protein called Gamma-tubulin complex component.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	J	664	Total 4714	C 1967	H 1419	N 664	O 664	0	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: Mitotic spindle organizing protein 1
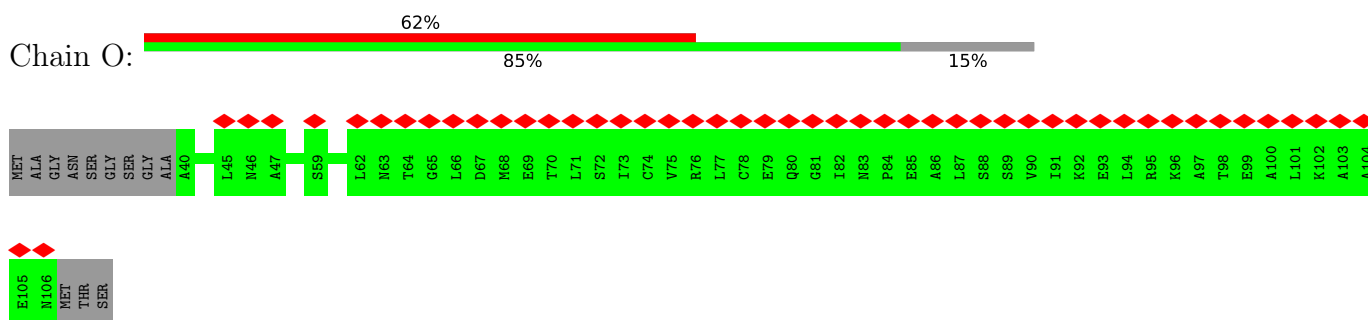
Chain O:

• Molecule 1: Mitotic spindle organizing protein 1
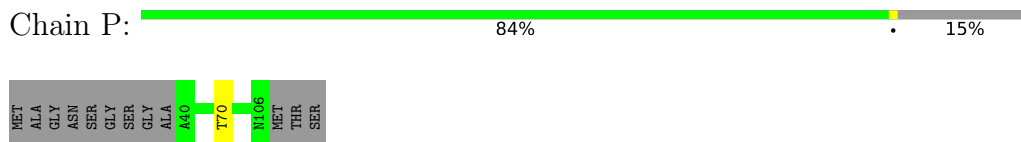
Chain P:

• Molecule 1: Mitotic spindle organizing protein 1

Chain Q:

• Molecule 2: Mitotic-spindle organizing protein 2A isoform X4

Chain Y:

• Molecule 3: Tubulin gamma chain

Chain a:

98%

M1 E39 Q280 S281 V282 A283 S284 V285 P368 T444 SER TRP GLY THR GLN GLU GLN

● Molecule 3: Tubulin gamma chain

Chain m:

95%

98%

M1 P2 R3 E4 I5 I6 T7 L8 Q9 L10 G11 Q12 C13 G14 N15 Q16 I17 G18 F19 E20 F21 W22 K23 Q24 L25 C26 A27 E28 H29 G30 I31 S32 P33 E34 G35 I36 V37 E38 E39 F40 A41 T42 E43 G44 T45 D46 R47 K48 D49 V50 F51 F52 Y53 Q54 A55 D56 D57 E58 H59 Y60

I61 P62 R63 A64 V65 L66 L67 D68 L69 E70 P71 R72 V73 I74 H75 S76 I77 L78 N79 S80 P81 Y82 A83 K84 L85 Y86 N87 P88 E89 N90 I91 Y92 L93 S94 E95 H96 G97 G98 G99 A100 G101 N102 N103 W104 A105 S106 G107 F108 S109 Q110 G111 E112 K113 I114 H115 E116 D117 I118 F119 D120

I121 I122 D123 R124 E125 A126 D127 G128 S129 D130 S131 L132 E133 G134 F135 V136 L137 C138 H139 S140 I141 A142 G143 G144 T145 G146 S147 G148 L149 G150 S151 Y152 L153 L154 E155 R156 L157 N158 D159 R160 Y161 P162 K163 K164 L165 V166 Q167 T168 Y169 S170 V171 F172 P173 N174 Q175 D176 E177 M178 S179 D180

V181 V182 V183 Q184 P185 Y186 N187 S188 L189 L190 T191 L192 K193 R194 L195 T196 Q197 N198 A199 D200 C201 V202 V203 V204 L205 D206 N207 T208 A209 L210 N211 R212 I213 A214 T215 D216 R217 L218 H219 I220 Q221 N222 P223 S224 F225 S226 Q227 Q228 N229 Q230 L231 V232 S233 T234 I235 M236 S237 A238 S239 T240
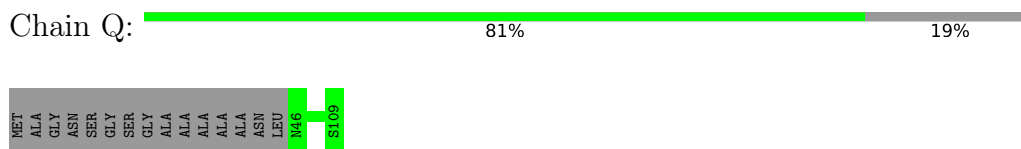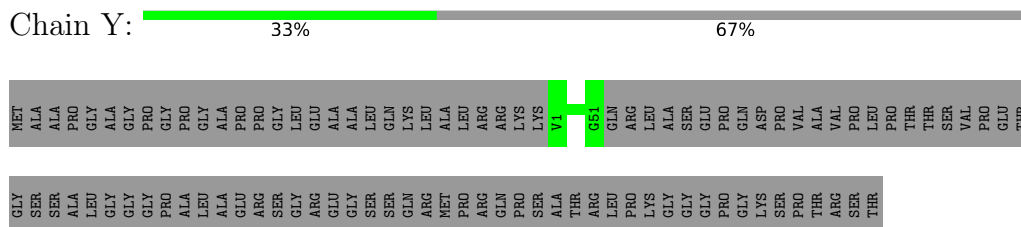
T241 T242 L243 R244 Y245 P246 G247 L253 I257 A258 S259 L260 I261 P262 T263 P264 R265 L266 H267 F268 L269 M270 T271 G272 Y273 T274 P275 L276 T277 T278 D279 Q280 S281 V282 A283 S284 V285 R286 K287 T288 T289 V290 L291 D292 V293 M294 R295 R296 L297 L298 Q299 P300 K301 N302 V303 M304 V305 S306

T307 G308 R309 D310 R311 Q312 T313 N314 H315 C316 Y317 I318 A319 I320 L321 N322 I323 I324 Q325 G326 E327 V328 D329 P330 T331 Q332 V333 H334 K335 S336 L337 Q338 R339 I340 R341 E342 R343 K344 L345 A346 N347 F348 I349 P350 W351 G352 P353 A354 S355 I356 Q357 V358 S361 R362 K363 S364 P365 Y366 L367

P368 S369 A370 H371 R372 V373 S374 G375 L376 M377 M378 A379 N380 H381 T382 S383 I384 S385 S386 L387 F388 E389 S390 S391 C392 Q393 Q394 Y395 D396 K397 L398 R399 K400 R401 E402 A403 F404 L405 E406 Q407 F408 R409 K410 E411 D412 I413 F414 K415 E416 N417 F418 D419 E420 L421 D422 R423 S424 R425 E426 V427

V428 Q429 E430 L431 I432 D433 E434 Y435 H436 A437 A438 T439 R440 P441 D442 Y443 I444 SER TRP GLY THR GLN GLU GLN

● Molecule 3: Tubulin gamma chain

Chain b:

98%

M1 D56 N174 GLN ASP GLU MET SER ASP V181 D279 Q280 S281 V282 A283 S284 V285 T448 GLN GLU GLN

● Molecule 3: Tubulin gamma chain

Chain c:

98%

M1 F40 A41 T42 D180 T278 ASP GLN SER VAL ALA SER VAL R286 R309 D310 R311 Q312 P365 P368 S369 A370 G447 THR GLN GLU GLN

• Molecule 3: Tubulin gamma chain

Chain d:

94%   6%

M1 T277 THR ASP GLN SER VAL ALA SER VAL ARG K287 G308 ARG ASP ARG GLN THR ASN H315 K415 E416 P441 ASP TYR ILE SER TRP GLY THR GLN GLU GLN

• Molecule 3: Tubulin gamma chain

Chain e:

96%

M1 L66 T278 ASP GLN SER VAL ALA SER VAL ARG K287 R311 Q312 P368 R440 PRO ASP TYR ILE SER TRP GLY THR GLN GLU GLN

• Molecule 3: Tubulin gamma chain

Chain f:

96%

M1 T278 ASP GLN SER VAL ALA SER VAL R286 Q312 T313 K400 R440 PRO ASP TYR ILE SER TRP GLY THR GLN GLU GLN

• Molecule 3: Tubulin gamma chain

Chain g:

96%

M1 T278 ASP GLN SER VAL ALA SER VAL R286 P368 R440 PRO ASP TYR ILE SER TRP GLY THR GLN GLU GLN

• Molecule 3: Tubulin gamma chain

Chain h:

97%

M1 T278 ASP GLN SER VAL ALA SER VAL R286 W446 GLY THR GLN GLU GLN

• Molecule 3: Tubulin gamma chain

Chain i:

97%

M1 D279 GLN SER VAL ALA SER VAL ARG LYS T288 W446 GLY THR GLN GLU GLN

• Molecule 3: Tubulin gamma chain

Chain n:

92%

97%

M1 P2 R3 E4 I5 I6 T7 L8 Q9 L10 G11 Q12 C13 G14 N15 Q16 I17 G18 F19 E20 F21 W22 K23 Q24 L25 C26 A27 E28 H29 G30 I31 S32 P33 E34 G35 I36 V37 E38 E39 F40 A41 T42 E43 G44 T45 D46 R47 K48 D49 V50 F51 F52 Y53 Q54 A55 D56 D57 E58 H59 Y60

I61 P62 R63 A64 V65 L66 L67 D68 L69 E70 P71 R72 V73 I74 H75 S76 I77 L78 N79 S80 P81 Y82 A83 K84 L85 Y86 N87 P88 E89 N90 I91 Y92 L93 S94 E95 H96 G97 G98 G99 A100 G101 N102 N103 W104 A105 S106 G107 F108 S109 Q110 G111 E112 K113 I114 H115 E116 D117 I118 F119 D120

I121 I122 D123 R124 E125 A126 D127 G128 S129 D130 S131 L132 E133 G134 F135 V136 L137 C138 H139 S140 I141 A142 G143 G144 T145 G146 S147 G148 L149 G150 S151 Y152 L153 L154 E155 R156 L157 N158 D159 R160 Y161 P162 K163 K164 L165 V166 Q167 T168 Y169 S170 V171 F172 P173 N174 GLN ASP GLU MET SER ASP

V181 V182 V183 Q184 P185 Y186 N187 S188 L189 L190 T191 L192 K193 R194 L195 T196 Q197 N198 A199 D200 C201 V202 V203 V204 L205 D206 N207 T208 A209 L210 N211 R212 I213 A214 T215 D216 R217 L218 H219 I220 Q221 N222 P223 S224 F225 S226 Q227 I228 N229 Q230 L231 V232 S233 T234 I235 M236 S237 A238 S239 T240

T241 T242 L243 R244 Y245 P246 N250 S251 D252 L253 I254 G255 L256 I257 A258 S259 L260 I261 P262 T263 P264 R265 L266 H267 F268 L269 M270 T271 G272 Y273 T274 P275 L276 T277 T278 D279 Q280 S281 V282 A283 S284 V285 R286 K287 T288 T289 V290 L291 D292 V293 M294 R295 R296 L297 L298 Q299 P300 K301 N302

V303 M304 V305 S306 T307 G308 R309 D310 R311 Q312 T313 N314 H315 C316 Y317 I318 A319 I320 L321 N322 I323 I324 Q325 G326 E327 V328 D329 P330 T331 Q332 V333 Q338 R339 I340 E342 R343 K344 L345 A346 N347 F348 Q357 V358 A359 L360 S361 R362 K363 S364 P365 Y366 L367 P368 S369 A370 H371 R372

V373 S374 G375 L376 M377 M378 A379 N380 H381 T382 S383 I384 S385 S386 L387 F388 E389 S390 S391 C392 Q393 Q394 Y395 D396 K397 L398 R399 K400 R401 E402 A403 F404 L405 E406 Q407 F408 R409 K410 E411 D412 I413 F414 K415 E416 N417 F418 D419 E420 L421 D422 R423 S424 R425 E426 V427 V428 Q429 E430 L431 I432

D433 E434 Y435 H436 A437 A438 T439 R440 P441 D442 S445 T448 GLN GLU GLN

• Molecule 3: Tubulin gamma chain

Chain k:

97%

M1 E43 D176 Q227 T278 ASP GLN SER VAL ALA SER VAL ARG K287 R311 Q312 W446 GLY THR GLN GLU GLN

• Molecule 3: Tubulin gamma chain

Chain j:

97%

M1 E39 PHE ALA THR GLU GLY T45 V282 A283 S284 V285 I444 SER TRP GLY THR GLN GLU GLN

• Molecule 3: Tubulin gamma chain

Chain l:

15%

96%

M1 I36 V37 E38 E39 F40 A41 T42 A55 D56 D57 E58 H75 N79 E95 E116 R124 D127 Q175 D176 E177 M178 S179 N207 T215 D216 R217 L218 H219 I220 Q221 N222 P223 S224 F225 S226 Q227 I228 T277 THR ASP GLN SER VAL ALA SER VAL ARG

K287 Q299 P300 V303 R309 D310 R311 Q312 T313 N314 H315 P368 S369 A370 L398 R399 K400 R401 E402 A403 F404 L405 F408 R409 K410 E411 D412 I413 F414 K415 E416 N417 F418 P441 D442 Y443 I444 SER TRP GLY THR GLN GLU GLN

• Molecule 4: CDK5 regulatory subunit-associated protein 2

Chain w: 98%

MET MET ASP LEU VAL LEU GLU GLU GLU ASP VAL THR VAL PRO GLY THR LEU SER GLY CYS SER GLY LEU VAL PRO SER VAL PRO ASP ASP LEU ASP GLY ILE ASN PRO ASN ALA GLY LEU GLY ASN GLY LEU PRO ASN VAL SER GLU GLU THR VAL SER PRO THR ARG ALA ARG N59 M60

K61 D62 F63 E64 N65 E91 PHE HIS GLY PRO THR GLU HIS ILE TYR LYS THR ASN ILE GLU LEU LYS VAL GLU VAL GLU LYS LEU SER LEU VAL GLU ASP VAL THR GLU SER LEU ARG LEU ILE LEU LYS ALA SER LYS ALA VAL GLU GLU THR VAL SER GLU LEU ALA GLU ALA GLY ALA GLY SER GLU ILE GLN ARG

VAL LYS GLU ASP ALA ARG LYS LYS VAL GLN GLN VAL GLU ASP LEU LEU THR LYS ARG ILE LEU GLU LEU GLU GLU LYS LEU LYS SER LEU LEU SER LYS SER ASP VAL THR ALA ALA GLN ALA GLU LEU GLU LEU LYS ALA PHE LEU GLY THR GLU THR ALA LEU ARG GLU LEU GLU SER LEU LEU SER GLU MET LYS LYS

MET HIS GLU GLY GLY ASP LEU ALA MET ALA LEU VAL LEU GLU ASP GLY LYS ASP ARG LEU ILE GLU GLU LEU ALA LEU GLU GLU LYS ASP GLN GLU CYS LEU GLU GLU LYS SER GLN GLU MET ALA CYS PRO ASP ASN VAL ASN VAL SER SER GLY LEU ARG LEU CYS ALA

ALA PRO ARG GLU GLU LYS GLU ARG GLU THR GLU ALA ALA GLN MET GLU HIS GLN GLU LYS ARG ASN SER PHE GLU GLU ARG ILE LYS GLN ALA LEU GLU LEU ASP LEU ARG GLU GLU LYS ALA THR ARG LYS LYS ASN SER LEU LYS ARG ASP GLU LYS ALA ILE LEU GLY LEU LEU THR

MET ALA LEU LYS SER LYS GLU LYS LYS VAL GLU VAL ASN LEU GLN LEU ASN SER GLU ILE GLU LYS LEU GLU LEU THR GLN PHE GLN GLY GLU ASP TYR GLU THR LEU LYS SER GLU LEU ALA GLU LEU SER ALA LEU ARG

SER GLN ASN LEU THR LYS SER THR GLU ASN HIS ARG LEU ARG SER ILE LYS ILE THR GLU GLU SER ASP LEU GLN GLN ARG GLU LEU GLU LEU ASP SER THR ILE ARG ASP SER CYS THR ILE ARG ASN GLU VAL GLU LYS LEU GLY ASP CYS THR LEU ARG ARG ASN GLU VAL GLU

LYS LEU ARG ASN GLU VAL ASN GLU ARG GLU GLU LYS ALA MET GLU ASN ALA MET TYR LYS SER LEU LEU THR GLU GLY LEU THR GLU SER ASN GLU GLN GLU GLU VAL ILE LYS LEU HIS LEU LYS ASP THR LEU LYS ASP VAL ILE SER ASP GLU SER PHE ASN GLY LYS ASP GLU GLU VAL ILE

GLN GLN ASN CYS TYR LEU MET ALA ALA GLU GLU ASP LEU GLU LEU ARG SER GLU GLY LEU ILE THR GLU LYS SER ASP VAL LEU LEU GLU GLN LYS ALA HIS ARG GLU GLU GLY ILE ALA THR LYS LYS ASN SER LEU ARG ASP GLU VAL LEU LEU GLN PHE ASN GLY LYS ASP LEU GLU GLU VAL ILE TYR

THR HIS LEU VAL LYS SER LEU MET ALA GLU GLN SER ASP SER ILE ASN ASN LEU GLN ALA GLU GLU PHE ALA LEU ARG LYS GLU LEU GLN LEU GLU PRO GLY SER LYS VAL THR ILE PHE SER LYS LYS GLU GLN LYS SER GLN ALA HIS ARG GLU GLY SER LYS ASP VAL LEU LEU LEU GLN SER GLU ILE ARG ARG GLU GLU SER PHE SER LEU

TYR SER ASP GLN THR SER SER TYR LEU SER ILE CYS LEU GLU GLU ASN ASN LEU ARG PHE GLN LEU VAL GLU HIS PHE SER GLN GLU GLU LEU LYS LYS VAL SER ASP LEU ILE GLN LEU GLU VAL LYS GLU LEU TYR THR ASP ASN ASN GLN HIS LEU LYS LYS THR ILE PHE ASP LEU SER CYS MET GLY

PHE GLN GLY ASN GLY PHE PRO ASP ARG LEU ALA SER THR GLU GLN THR GLU THR GLU ALA LYS LYS SER ARG LEU PRO ILE LEU ILE LYS PRO SER ARG SER LEU GLY ASN MET TYR ARG LEU PRO ALA THR GLN GLU VAL VAL THR GLN LEU LEU SER GLN ILE LEU LEU GLU GLN GLY GLU

LEU LYS GLU PHE LYS THR CYS ASN LYS GLN LEU HIS GLN LYS LEU ALA GLU VAL MET GLY ARG PRO THR PRO ASP LYS THR LEU LEU ASN ALA GLN PRO PRO VAL GLY ALA ALA TYR GLN ASP SER GLU GLY LEU GLN LYS GLY ILE LEU LYS THR SER SER VAL TRP

ARG ASP LYS GLU MET ASP SER ASP GLN ARG SER TYR GLU ILE ASP SER GLU GLU ALA GLU VAL MET GLY ARG PRO ASP THR PRO ASP LYS THR PRO SER PRO CYS LYS SER GLU GLY TYR GLN ASN PRO GLU GLN ASP ALA SER ASN PRO GLU ASP VAL LEU SER THR SER VAL ALA THR TYR GLN LEU SER LYS SER THR SER SER VAL TRP

MET GLY THR ASP GLN SER GLU SER ILE THR ASN THR SER ASN GLU THR GLU TYR LEU LYS GLN ILE LEU HIS ASP LEU GLU GLU THR LEU LYS LEU HIS ASP PHE ILE PHE GLN LEU GLU GLN LYS HIS SER GLN SER GLU GLY ALA ILE THR LEU THR VAL LEU CYS GLY GLY GLU GLY ALA GLN

• Molecule 4: CDK5 regulatory subunit-associated protein 2

Chain x: ▪▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭ 98%

LYS LYS VAL GLU GLU LEU ASN SER GLU ILE GLU LYS LEU SER ALA ALA PHE ALA LYS ALA ARG GLU ALA LEU GLN LYS ALA GLN THR GLN ILE GLU PHE GLY SER GLU ASP TYR THR ALA LEU SER GLY LYS GLU ALA LEU SER ALA LEU ARG GLU GLN ASN LEU THR LYS SER

THR GLU ASN HIS ARG LEU ARG ARG SER ILE LYS LYS ILE LEU THR GLN GLU LEU SER ASP GLU LEU GLN GLN ARG GLU ARG LEU GLU LYS ASP LEU GLU GLU ALA HIS ARG GLU GLU LYS SER GLY ASP THR ILE ARG ASP ASP ARG ASN GLU VAL GLU LYS LEU ARG ASN GLU VAL ASN

GLU ARG GLU GLU ALA MET GLU ASN ARG TYR LYS SER LEU SER GLU SER ASN LYS LYS LYS LEU HIS ASN GLN GLU GLN GLN VAL ILE LYS HIS LEU LEU GLU THR GLU SER THR ASN GLN LYS ASP VAL LEU LEU GLN PHE ASN GLU GLU ASP LEU VAL ILE GLN ASN CYS TYR LEU MET

ALA ALA GLU LEU GLU ARG SER GLY LEU THR GLU GLU LEU THR GLU GLU ALA GLU ASN LYS ILE THR GLU LEU LYS CYS SER GLU SER GLN GLN PRO PRO GLY LEU SER LYS THR ILE PHE SER LEU GLU LYS GLN LEU GLN LYS GLN GLN SER ASP TYR GLU GLU ILE LEU GLN VAL LEU LYS GLY GLN ASP ILE TYR THR HIS LEU VAL LYS SER GLU LEU

GLN GLU SER ASP SER SER ILE GLU ASN ASN LEU GLN ALA GLU GLN ALA GLU GLU ASN LYS ILE PHE ALA LEU LEU ARG LYS GLN GLU LEU GLU GLN GLN ASP VAL LEU SER TYR GLN ASN LEU ARG LYS THR LEU GLU GLU SER ASP TYR GLU GLU GLU HIS THR LEU ALA ARG ARG GLU GLU GLU PHE SER LEU THR TYR SER ASP GLN GLN THR SER TYR

LEU SER ILE LEU GLU LEU GLU ASN ASN PHE GLN VAL GLU HIS PHE SER GLN GLU GLU GLU LEU LYS LYS LYS SER VAL SER ASP LEU ILE ILE GLN LEU VAL GLU LEU GLU TYR THR ASP ASN GLN HIS LEU LYS LYS THR ILE PHE ASP SER MET GLY PHE GLN GLY GLN GLY ASN GLY PHE PRO

ASP ARG LEU ALA SER THR GLU GLN THR GLU GLU ALA LYS LYS SER ARG LEU PRO ILE LEU ILE LYS PRO SER ARG SER LEU GLY ASN MET TYR LEU VAL LYS GLU LEU THR ASP VAL VAL THR GLN LEU ILE GLN SER ILE LEU GLU LEU GLY PHE LYS GLU LYS GLU LYS THR CYS

ASN LYS GLN LEU HIS GLN LYS ILE LEU ALA GLU ALA VAL MET GLY GLY ARG PRO THR PRO ASP LYS THR LEU LEU ASN ALA GLN PRO VAL GLY ALA ALA TYR GLN ASP SER PRO GLY GLU GLN GLN LYS GLY ILE LYS THR THR SER VAL TRP ARG ASP LYS GLU MET ASP SER

ASP GLN GLN ARG SER TYR GLU ILE ASP SER GLU ILE CYS PRO ASP ASP LEU ALA SER LEU PRO SER CYS LYS GLU ASN PRO GLU ASP VAL LEU SER PRO THR SER VAL ALA THR TYR LEU SER SER LYS GLN PRO SER ALA LYS VAL SER VAL MET GLY THR ASP GLN SER GLU GLU

SER ILE ASN THR SER ASN GLU THR GLU LEU LYS GLN LYS ILE HIS ASP LEU GLU THR GLU LEU GLU GLY TYR GLN ASN PHE ILE PHE GLN LEU GLU GLY LYS SER HIS GLU SER CYS SER GLU ALA ILE ILE THR VAL LEU CYS THR GLU GLY GLY ALA GLN ASP GLY LEU SER LYS PRO LYS

ASN GLY SER ASP GLY GLU GLU MET THR PHE SER SER LEU HIS GLN VAL ARG TYR VAL LYS HIS VAL LYS ILE LEU LEU GLY PRO LEU ALA PRO GLU MET ILE ASP SER ARG VAL LEU GLU ASN LEU GLU GLU GLN GLN GLU GLN GLN GLU GLU TYR LYS LEU GLN LEU ASN LEU ASN MET

GLN LEU PHE GLU ILE HIS ASN LEU GLN ASN LYS ARG ASP SER PRO ARG PRO ARG TYR ASP SER LEU VAL GLN SER GLN ALA ARG GLU SER LEU GLN ARG GLN GLN ILE LYS ASP GLY ILE VAL ILE CYS VAL ILE SER HIS MET ASN THR MET THR ILE LYS ALA PHE

GLU GLU LEU LEU GLN ALA SER ASP VAL ASP TYR CYS VAL ALA GLU GLY PHE GLN GLU GLN GLN LEU ASN GLN GLN CYS ALA GLU LEU LEU LEU LYS LEU GLU LYS PHE LEU ASN GLY LYS SER VAL GLY VAL GLU MET ASN THR GLN ASN ASP GLN ASN GLU MET GLU ARG ILE GLU GLU ASP ASN LEU

THR TYR GLN HIS LEU LEU PRO GLU SER PRO GLU PRO GLY SER ALA SER HIS ALA LEU SER ASP TYR THR SER GLU LYS PHE PHE SER GLU ASP GLN ASN GLU ASN GLN GLU THR GLU LYS SER THR SER VAL MET VAL ASN SER PHE SER GLN ASP ALA LEU MET GLU MET GLU HIS ILE GLU GLN GLU

ILE ARG THR LEU ARG LYS ARG LEU GLU GLU GLN SER ILE LEU THR LYS GLN ASN GLU ASP LYS LEU ARG LYS ARG GLU LEU SER ARG GLN GLY SER ILE GLU THR SER GLU PHE VAL GLN GLY SER ASP GLN LYS LEU GLN ASP HIS LEU ASN SER GLU LEU SER GLU HIS PHE LEU ARG LYS ASN GLN GLN LEU ALA

LEU ASN ALA MET LEU ILE LYS ARG LEU GLU SER GLY ARG ASP LYS LYS SER GLN LEU ARG SER LEU GLU ARG LYS GLY GLN GLU ARG GLU GLY TYR ALA VAL LYS GLU GLU ASP HIS LEU GLU GLN ARG LEU LYS GLU GLY SER GLU GLU LYS ARG ASN HIS ASN GLN GLN

LEU ILE GLN GLY VAL ARG CYS SER GLY GLU GLU LEU SER ARG VAL GLN GLU GLU LEU SER ASP LYS LEU GLU SER LEU ARG GLU VAL GLU LEU LYS ALA TYR GLU GLU LEU ASP GLU HIS ARG LEU ARG GLU GLU ALA SER GLY ARG LEU HIS ASN GLN GLN

TRP LYS GLY GLN ASP PRO PHE ARG ASP LEU GLU HIS SER LEU LEU MET GLU ILE GLN ALA LEU ARG LEU GLN SER GLU GLN THR SER LEU GLN SER ARG LEU LYS GLU GLN ASP LEU ALA ARG GLY ALA GLU LYS ALA ALA GLN GLU GLU GLY LEU ALA LEU THR LEU ALA VAL GLN ALA

VAL SER ILE PRO GLU VAL VAL PRO LEU GLN GLN PRO ASP LYS ASP ASP GLY ASP LYS TYR PRO MET GLU ASP SER ASP ASN SER PHE GLN GLY LEU GLY SER THR ALA VAL THR PRO LYS SER VAL SER GLU VAL GLU ALA TYR GLU LEU PRO LEU SER GLY ASN ASP SER CYS ASP SER GLY SER

SER ALA THR SER PRO CYS VAL SER ARG LEU VAL THR HIS HIS GLY LEU TRP ALA SER LYS ASN GLY ARG HIS VAL LEU GLY LEU ILE GLU LEU TYR GLU GLY ALA LEU LEU LEU GLN ILE SER GLY GLN ARG LEU LEU ARG GLU GLU ALA SER ALA GLU MET ASP ILE GLN THR GLN GLN GLU ALA PRO SER SER

THR SER GLN GLU LEU GLY THR LYS GLY PRO HIS PRO ALA PRO LEU SER LYS PHE VAL SER SER VAL THR ALA LYS LEU THR LEU GLU GLU ALA TYR ARG LEU LYS LEU LEU TRP ARG VAL SER LEU PRO GLU ASP GLY GLN CYS PRO LEU HIS CYS GLU GLN ILE GLY GLU MET

LYS ALA GLU VAL THR LYS LEU HIS LYS LEU PHE GLU GLN GLU LYS LYS LEU GLN ASN THR MET LYS LEU LEU GLN LEU SER LYS ARG GLN GLU LYS VAL ILE PHE ASP GLN LEU VAL VAL THR HIS LYS ILE LEU ARG ALA ARG GLY ASN LEU GLU LEU ARG PRO GLY GLY ALA

HIS PRO GLY THR CYS SER PRO SER ARG PRO GLY SER

• Molecule 5: Gamma-tubulin complex component 3

Chain N:

• Molecule 5: Gamma-tubulin complex component 3

Chain B:　　68%　　32%

ALA ALA THR PRO ASP GLN LYS SER PRO ASN VAL LEU LEU GLN ASN LEU CYS CYS ARG ILE LEU GLY LYS SER GLU ALA ASP VAL ALA GLN GLN PHE GLN TYR ALA VAL ARG VAL ILE GLY SER ASN PHE ALA PRO THR VAL GLU ARG ASP GLU PHE LEU VAL ALA GLU LYS ILE LYS LYS

GLU LEU THR ARG GLN ARG ARG GLU ALA ASP ALA ALA LEU PHE SER GLU LEU HIS ARG LYS LEU HIS SER GLN GLY VAL LEU LYS ASN LYS TRP SER ILE LEU TYR LEU LEU LEU SER LEU GLU ASP PRO ARG LYS GLN PRO SER LYS VAL SER GLY TYR ALA ALA LEU PHE ALA GLN

ALA LEU PRO ASP ALA HIS SER THR PRO TYR TYR TYR ALA ARG PRO GLN GLN SER LEU PRO LEU ASN TYR GLN GLU ARG GLY ALA PRO SER ALA GLN SER ALA GLY SER ALA GLY SER SER GLY VAL SER SER LEU GLY THR TYR ALA LEU ASN GLY PRO THR PRO PRO PRO PRO PRO

ALA LEU LEU PRO GLY GLN PRO LEU PRO ALA PRO GLY VAL GLY LEU ASP GLY LEU ARG GLN GLN LEU LEU GLY SER ARG LEU ALA TRP THR LEU THR ALA SER GLN PRO SER LEU PRO SER THR SER GLY THR TYR ALA LEU ASN GLY PRO SER ARG GLY ALA ALA ARG PRO ARG ARG GLU GLY ASP

ALA ALA ALA G244 D353 ASP GLN GLY VAL ASN LEU GLY LEU GLU SER SER L365 V512 THR LYS SER ALA GLU SER PRO GLN ASP ALA A523 T594 L595 G634 R816 GLU ALA GLU GLN TRP GLY VAL SER A826 P894 ARG LEU ARG VAL SER LEU GLY THR ARG GLY

ARG ARG SER SER HIS THR

• Molecule 5: Gamma-tubulin complex component 3

Chain H:　　81%　　19%

MET ALA THR PRO ASP GLN K7 P108 R124 ASP ALA HIS SER THR PRO TYR TYR TYR ALA ARG PRO GLN GLN SER LEU PRO LEU ASN TYR GLU GLU ARG GLY ALA PRO SER ALA GLN SER ALA GLN ALA GLY SER ALA GLY SER SER GLY SER GLY VAL SER SER GLY GLY THR TYR ALA LEU ASN GLY PRO

THR PRO PRO PRO PRO PRO ALA LEU LEU PRO GLY GLN PRO LEU PRO ALA PRO GLY VAL GLY LEU ASP GLY LEU ARG GLN GLN LEU GLY LEU SER ARG LEU ALA TRP THR LEU THR ALA SER GLN PRO SER LEU PRO SER THR THR SER LYS ALA VAL PRO SER SER GLY SER ARG GLY ALA ALA

ARG PRO ARG ARG GLU GLY ASP ALA ALA ALA G244 D353 ASP GLN GLY VAL ASN LEU GLY LEU GLU SER SER L365 V512 THR LYS SER ALA GLU SER PRO GLN ASP ALA A523 R816 GLU ALA GLU GLY GLY GLN TRP GLY VAL SER A826 P894 ARG LEU ARG VAL SER LEU GLY THR

ARG GLY ARG ARG SER HIS THR

• Molecule 5: Gamma-tubulin complex component 3

Chain D:　　68%　　32%

MET ALA THR PRO ASP GLN LYS SER PRO ASN VAL LEU LEU GLN ASN LEU CYS CYS ARG ILE LEU GLY LYS SER GLU ALA ASP VAL ALA GLN GLN PHE GLN TYR ALA VAL ARG VAL ILE GLY SER ASN PHE ALA PRO THR VAL GLU ARG ASP GLU PHE LEU VAL ALA GLU LYS ILE LYS LYS

GLU LEU THR ARG GLN ARG ARG GLU ALA ASP ALA ALA LEU PHE SER GLU LEU HIS ARG LYS LEU HIS SER GLN GLY VAL LEU LYS ASN LYS TRP SER ILE LEU TYR LEU LEU LEU SER LEU GLU ASP PRO ARG LYS GLN PRO SER LYS VAL SER GLY TYR ALA ALA LEU PHE ALA GLN

ALA LEU PRO ASP ALA HIS SER THR PRO TYR TYR TYR ALA ARG PRO GLN GLN SER LEU PRO LEU ASN TYR GLN GLU ARG GLY ALA PRO SER ALA GLN SER ALA GLY SER ALA GLY SER SER GLY VAL SER SER LEU GLY THR TYR ALA LEU ASN GLY PRO THR PRO PRO PRO PRO PRO

ALA LEU LEU PRO GLY GLN PRO LEU PRO ALA PRO GLY VAL GLY LEU ASP GLY LEU ARG GLN GLN LEU LEU GLY SER ARG LEU ALA TRP THR LEU THR ALA SER GLN PRO SER LEU PRO SER THR SER GLY THR TYR ALA LEU ASN GLY PRO SER ARG GLY ALA ALA ARG PRO ARG ARG GLU GLY ASP

ALA ALA ALA G244 D353 ASP GLN GLY VAL ASN LEU GLY LEU GLU SER SER L365 V512 THR LYS SER ALA GLU SER PRO GLN ASP ALA A523 R816 GLU ALA GLU GLY GLN TRP GLY VAL SER A826 P894 ARG LEU ARG VAL SER LEU GLY THR ARG GLY ARG ARG SER HIS

THR

• Molecule 5: Gamma-tubulin complex component 3

Chain F: 68%   32%

THR

• Molecule 6: Gamma-tubulin complex component

Chain M: 14%   86%   14%

• Molecule 6: Gamma-tubulin complex component

Chain A: 74%   26%

• Molecule 6: Gamma-tubulin complex component

Chain C:

74%   26%

• Molecule 6: Gamma-tubulin complex component

Chain E:

74%   26%

- Molecule 6: Gamma-tubulin complex component

Chain G:

74%   26%

- Molecule 7: Tubulin gamma complex associated protein 6

Chain L:

45%   55%

• Molecule 8: Gamma-tubulin complex component

Chain I:

88% 12%

• Molecule 8: Gamma-tubulin complex component

Chain K:

88% 12%

• Molecule 9: Gamma-tubulin complex component

Chain J:

64% 36%

ASP SER GLY ILE GLN VAL ASP ARG THR PRO LEU GLU GLU GLN GLN ASP GLN SER ARG LYS PRO ALA SER ARG VAL SER TRP LYS VAL ASP GLU PRO ASP ALA ARG SER TRP LEU GLU GLN HIS VAL VAL **R223** **S339** SER GLU SER THR LEU PRO GLY ASN GLY SER VAL PRO LYS LYS **S354**

V518 SER GLU LYS THR GLU ASN GLU GLU LYS MET SER ASP ASN ALA SER SER ALA SER SER GLY SER ASP GLN GLY PRO SER SER ARG **Q546** **E677** SER THR THR CYS GLN ALA MET ALA ARG ASP ALA **E589** **G608** GLU ASP ALA THR ALA GLN ALA LEU THR GLU GLN GLN ALA THR

ARG GLU THR LEU ILE LYS MET GLN SER ILE ALA GLU ARG HIS LEU GLU LEU ASP ASP VAL HIS ASP PRO LEU LEU ALA ILE ASN PHE ALA ARG LEU TYR LEU GLU GLN ASP SER PHE HIS GLU LYS PHE ALA GLY GLY ASP ILE CYS VAL ASP ARG SER SER **E677** **F782** GLU ASN THR

ASP THR ALA LYS LYS LYS **L792** **S850** ALA GLU LYS PRO GLN SER LYS GLU GLY LEU LEU SER GLY GLN ASP THR ALA ALA GLN PHE GLY PRO GLN LYS GLU PRO VAL **R878** ◆**Q1012** **L1013** ◆**R1014** ◆**G1039** **I1040** ◆**I1041** ◆**G1042**

4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	80608	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	55	Depositor
Minimum defocus (nm)	900	Depositor
Maximum defocus (nm)	2900	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.846	Depositor
Minimum map value	-0.251	Depositor
Average map value	0.003	Depositor
Map value standard deviation	0.034	Depositor
Recommended contour level	0.125	Depositor
Map size (Å)	542.7187, 542.7187, 542.7187	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.41333, 1.41333, 1.41333	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	O	0.23	0/332	0.34	0/462
1	P	0.26	0/332	0.45	0/462
1	Q	0.26	0/317	0.42	0/441
2	Y	0.25	0/251	0.39	0/348
3	a	0.26	0/2193	0.47	0/3053
3	b	0.26	0/2181	0.46	0/3034
3	c	0.27	0/2171	0.47	0/3020
3	d	0.26	0/2101	0.47	0/2921
3	e	0.25	0/2132	0.46	0/2966
3	f	0.26	0/2137	0.46	0/2973
3	g	0.26	0/2137	0.46	0/2973
3	h	0.27	0/2167	0.45	0/3015
3	i	0.27	0/2162	0.48	0/3008
3	j	0.27	0/2168	0.48	0/3017
3	k	0.26	0/2162	0.45	0/3008
3	l	0.25	0/2147	0.45	0/2987
3	m	0.25	0/2193	0.44	0/3053
3	n	0.25	0/2181	0.47	0/3034
4	w	0.22	0/164	0.34	0/228
4	x	0.21	0/169	0.34	0/235
5	B	0.26	0/3077	0.40	0/4287
5	D	0.26	0/3077	0.41	0/4287
5	F	0.27	0/3077	0.42	0/4287
5	H	0.28	0/3662	0.43	0/5102
5	N	0.24	0/3502	0.44	2/4879 (0.0%)
6	A	0.26	0/3316	0.42	0/4620
6	C	0.27	0/3316	0.42	0/4620
6	E	0.27	0/3316	0.44	0/4620
6	G	0.28	0/3316	0.44	0/4620
6	M	0.24	0/3875	0.41	0/5399
7	L	0.26	0/3805	0.48	0/5281
8	I	0.28	0/2901	0.44	0/4036
8	K	0.26	0/2901	0.43	0/4036
9	J	0.26	0/3288	0.44	0/4577

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
All	All	0.26	0/78226	0.44	2/108889 (0.0%)

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
3	a	0	1
3	b	0	1
3	j	0	1
3	m	0	1
3	n	0	3
5	N	0	1
All	All	0	8

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	N	574	GLY	N-CA-C	6.72	129.91	113.10
5	N	576	PHE	N-CA-C	6.09	127.43	111.00

There are no chirality outliers.

All (8) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
5	N	575	ASP	Peptide
3	a	284	SER	Peptide
3	b	284	SER	Peptide
3	j	284	SER	Peptide
3	m	284	SER	Peptide
3	n	261	ILE	Peptide
3	n	262	PRO	Peptide
3	n	284	SER	Peptide

5.2　Too-close contacts　ⓘ

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

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	O	65/79 (82%)	65 (100%)	0	0	100	100
1	P	65/79 (82%)	63 (97%)	1 (2%)	1 (2%)	8	39
1	Q	62/79 (78%)	59 (95%)	3 (5%)	0	100	100
2	Y	49/155 (32%)	49 (100%)	0	0	100	100
3	a	442/451 (98%)	431 (98%)	10 (2%)	1 (0%)	44	78
3	b	438/451 (97%)	429 (98%)	8 (2%)	1 (0%)	44	78
3	c	436/451 (97%)	429 (98%)	7 (2%)	0	100	100
3	d	420/451 (93%)	414 (99%)	6 (1%)	0	100	100
3	e	428/451 (95%)	422 (99%)	6 (1%)	0	100	100
3	f	429/451 (95%)	421 (98%)	8 (2%)	0	100	100
3	g	429/451 (95%)	421 (98%)	8 (2%)	0	100	100
3	h	435/451 (96%)	427 (98%)	8 (2%)	0	100	100
3	i	434/451 (96%)	426 (98%)	8 (2%)	0	100	100
3	j	435/451 (96%)	422 (97%)	12 (3%)	1 (0%)	44	78
3	k	434/451 (96%)	426 (98%)	8 (2%)	0	100	100
3	l	431/451 (96%)	423 (98%)	8 (2%)	0	100	100
3	m	442/451 (98%)	431 (98%)	10 (2%)	1 (0%)	44	78
3	n	438/451 (97%)	425 (97%)	13 (3%)	0	100	100
4	w	31/1663 (2%)	31 (100%)	0	0	100	100
4	x	32/1663 (2%)	32 (100%)	0	0	100	100
5	B	613/910 (67%)	608 (99%)	5 (1%)	0	100	100
5	D	613/910 (67%)	608 (99%)	5 (1%)	0	100	100
5	F	613/910 (67%)	607 (99%)	6 (1%)	0	100	100
5	H	729/910 (80%)	718 (98%)	11 (2%)	0	100	100
5	N	699/910 (77%)	682 (98%)	16 (2%)	1 (0%)	48	83

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Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
6	A	659/905 (73%)	644 (98%)	14 (2%)	1 (0%)	44	78
6	C	659/905 (73%)	646 (98%)	12 (2%)	1 (0%)	44	78
6	E	659/905 (73%)	644 (98%)	14 (2%)	1 (0%)	44	78
6	G	659/905 (73%)	645 (98%)	13 (2%)	1 (0%)	44	78
6	M	772/905 (85%)	743 (96%)	27 (4%)	2 (0%)	37	72
7	L	753/1715 (44%)	677 (90%)	72 (10%)	4 (0%)	25	63
8	I	577/667 (86%)	567 (98%)	9 (2%)	1 (0%)	44	78
8	K	577/667 (86%)	568 (98%)	8 (1%)	1 (0%)	44	78
9	J	650/1042 (62%)	636 (98%)	14 (2%)	0	100	100
All	All	15607/23198 (67%)	15239 (98%)	350 (2%)	18 (0%)	50	83

All (18) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
6	A	321	LEU
6	C	321	LEU
6	E	321	LEU
6	G	321	LEU
5	N	574	GLY
7	L	421	SER
6	M	367	THR
6	M	369	ASP
7	L	451	PRO
7	L	1379	VAL
8	K	409	ASN
7	L	346	LEU
8	I	409	ASN
1	P	70	THR
3	m	285	VAL
3	a	285	VAL
3	b	285	VAL
3	j	285	VAL

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 oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

There are no ligands in this entry.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

The following chains have linkage breaks:

Mol	Chain	Number of breaks
6	G	1
6	A	1
6	C	1
6	E	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	G	850:ASP	C	851:CYS	N	3.27
1	A	850:ASP	C	851:CYS	N	3.01
1	C	850:ASP	C	851:CYS	N	2.91
1	E	850:ASP	C	851:CYS	N	2.88

6   Map visualisation   ⓘ

This section contains visualisations of the EMDB entry EMD-51019. 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   ⓘ

6.1.1   Primary map

X   Y   Z

6.1.2   Raw map

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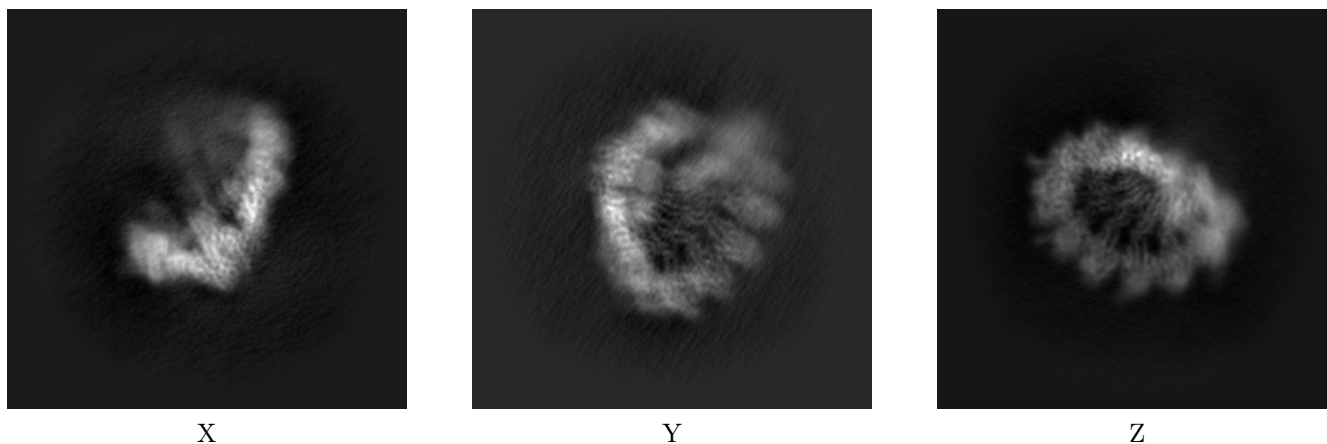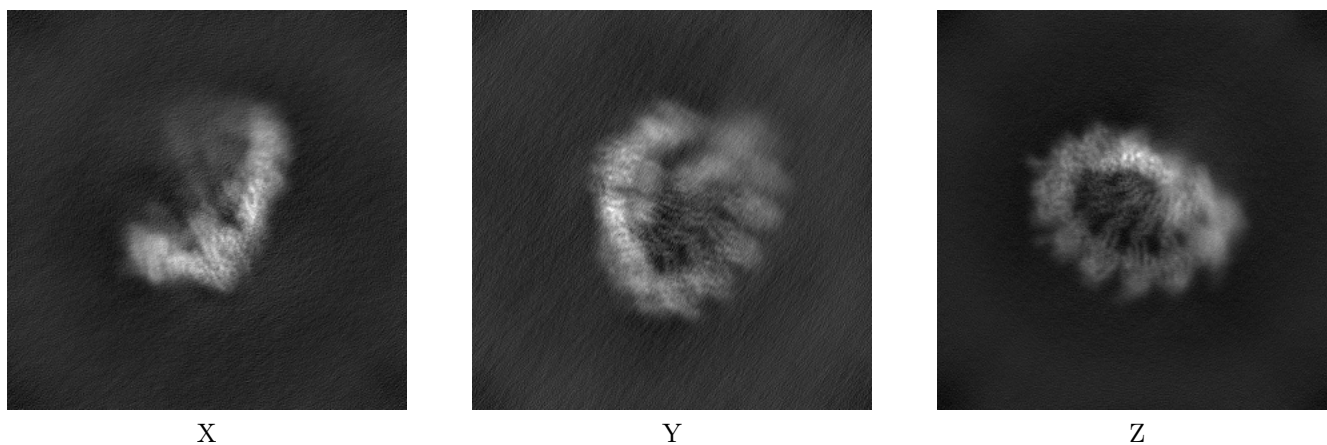
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ
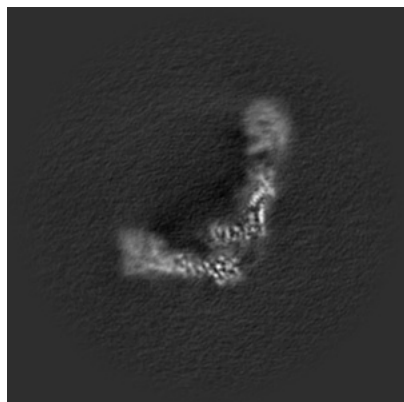
6.2.1 Primary map
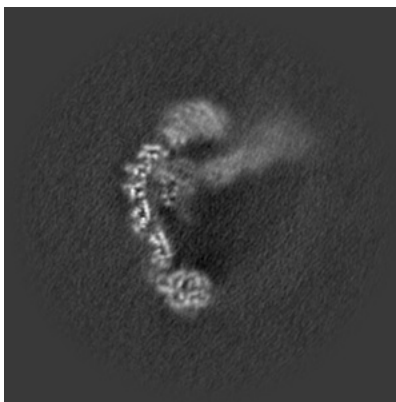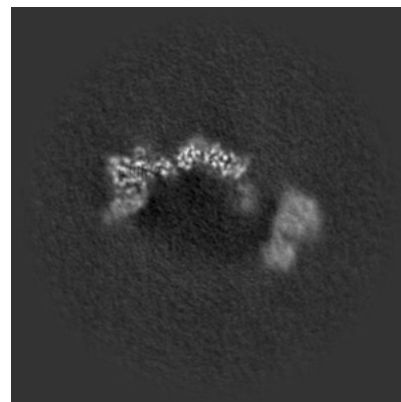
| X Index: 192 | Y Index: 192 | Z Index: 192 |

6.2.2 Raw map
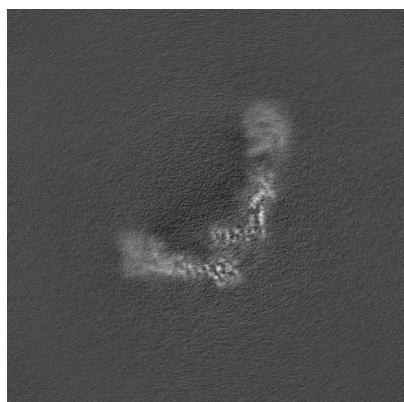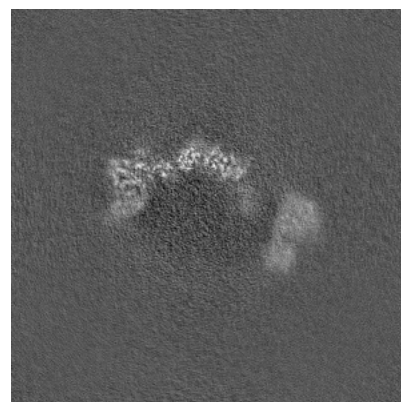
| X Index: 192 | Y Index: 192 | Z Index: 192 |

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

6.3　Largest variance slices ⓘ

6.3.1　Primary map
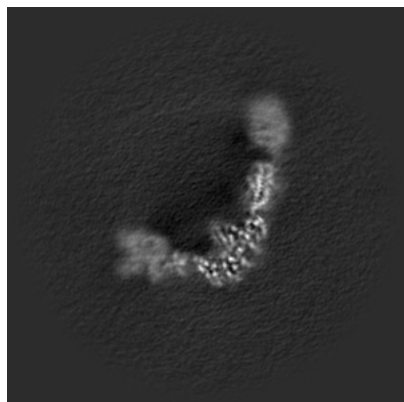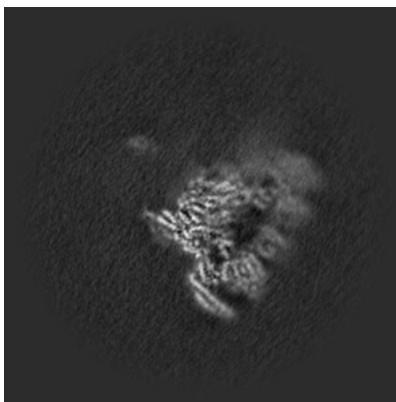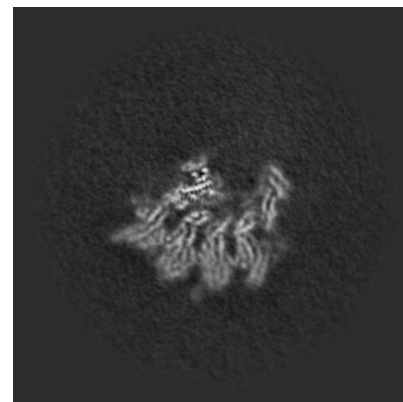
| X Index: 187 | Y Index: 235 | Z Index: 143 |

6.3.2　Raw map
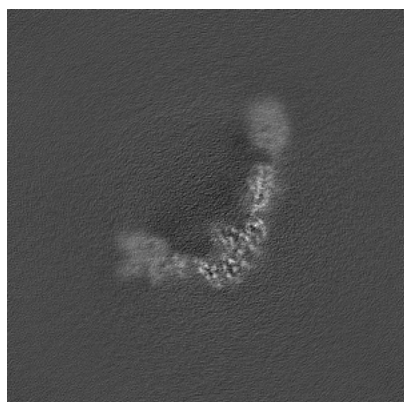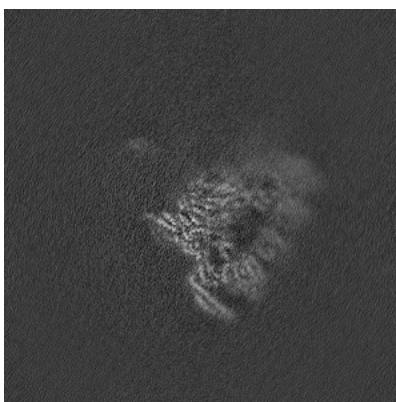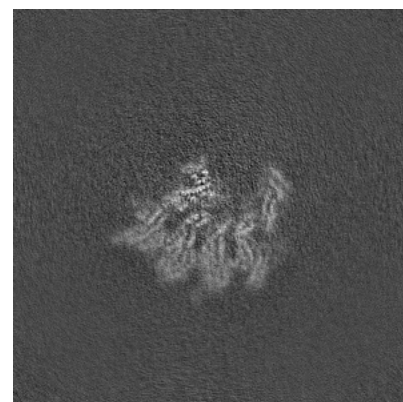
| X Index: 187 | Y Index: 235 | Z Index: 143 |

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

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

6.4.1 Primary map

X   Y   Z

6.4.2 Raw map

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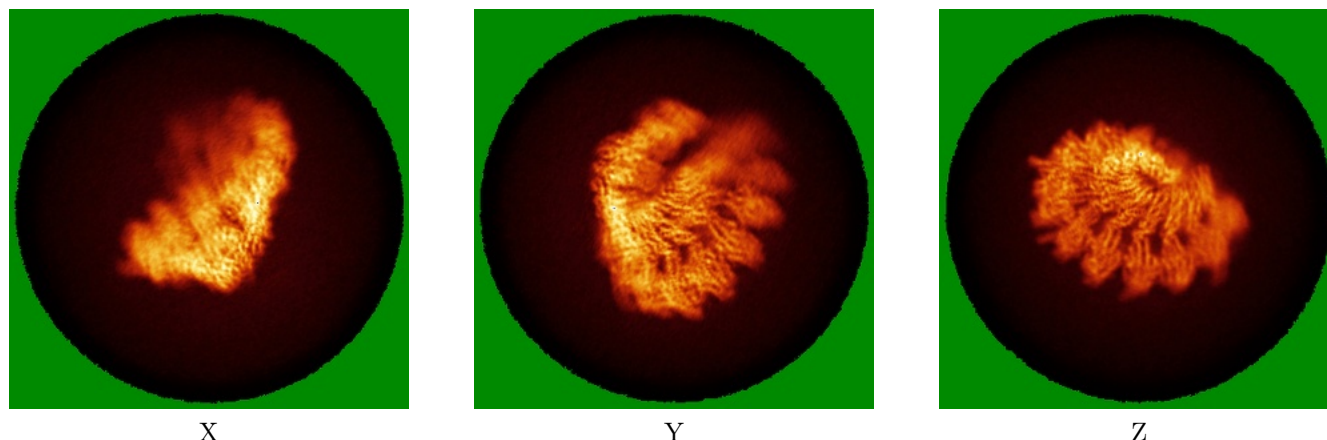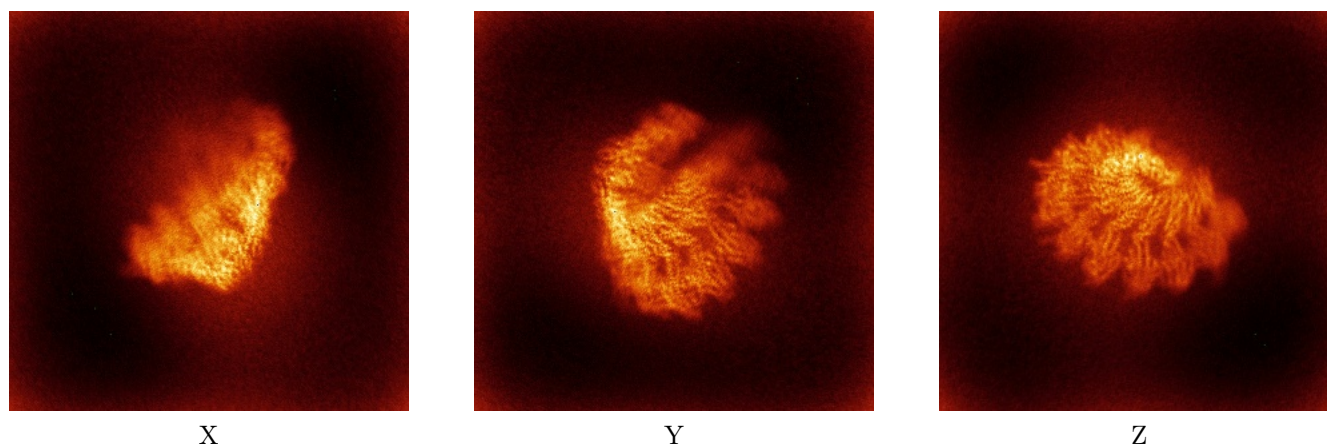
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views (i)

6.5.1 Primary map

X   Y   Z
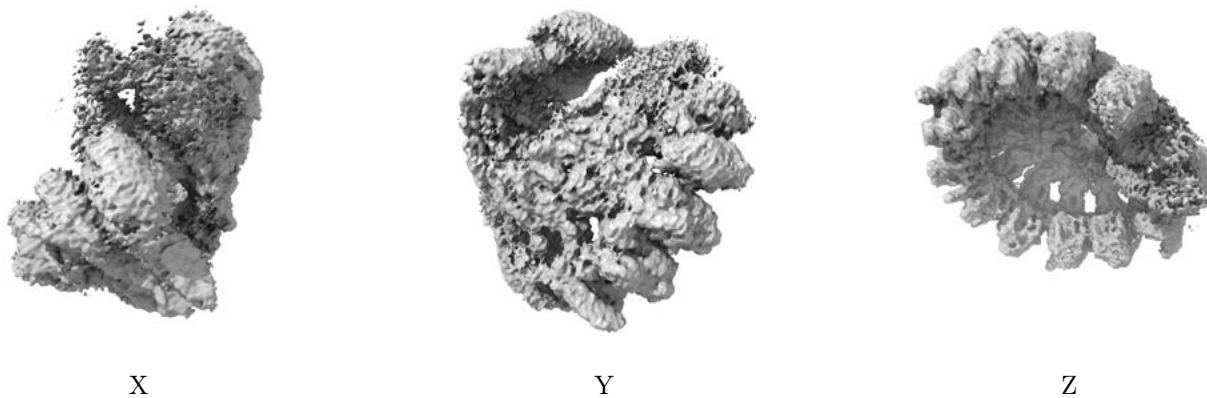
The images above show the 3D surface view of the map at the recommended contour level 0.125. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map

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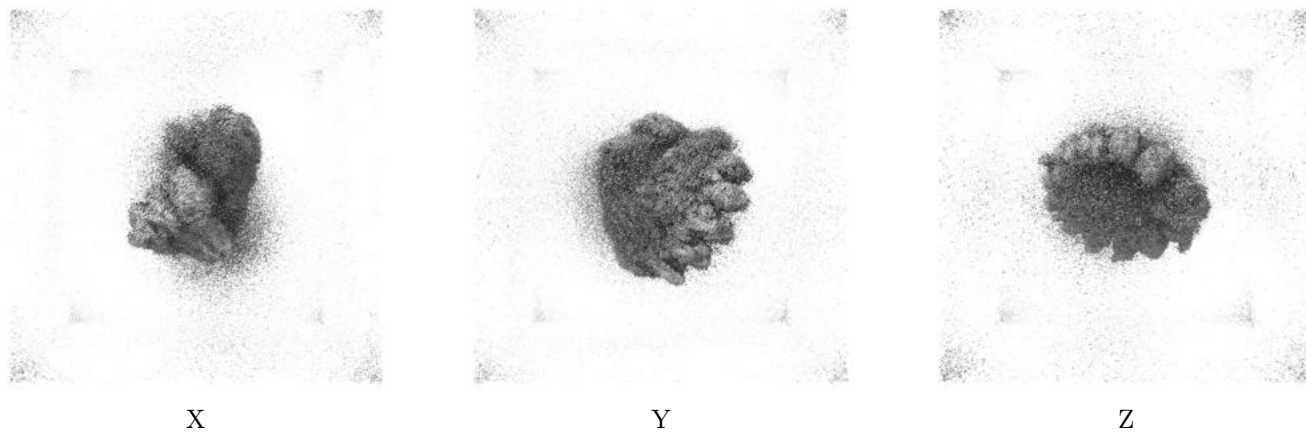
These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

6.6 Mask visualisation (i)

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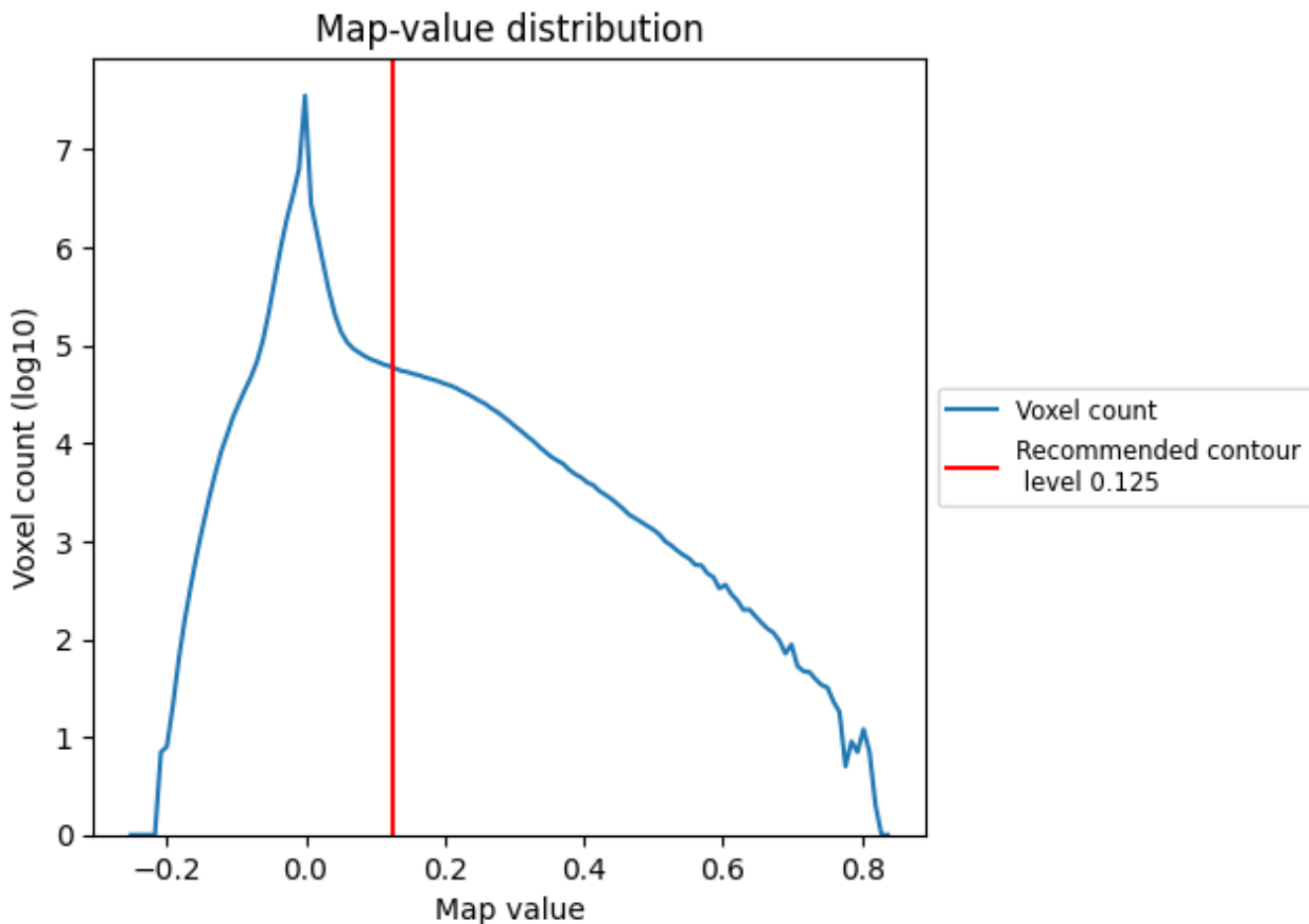
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2 Volume estimate (i)
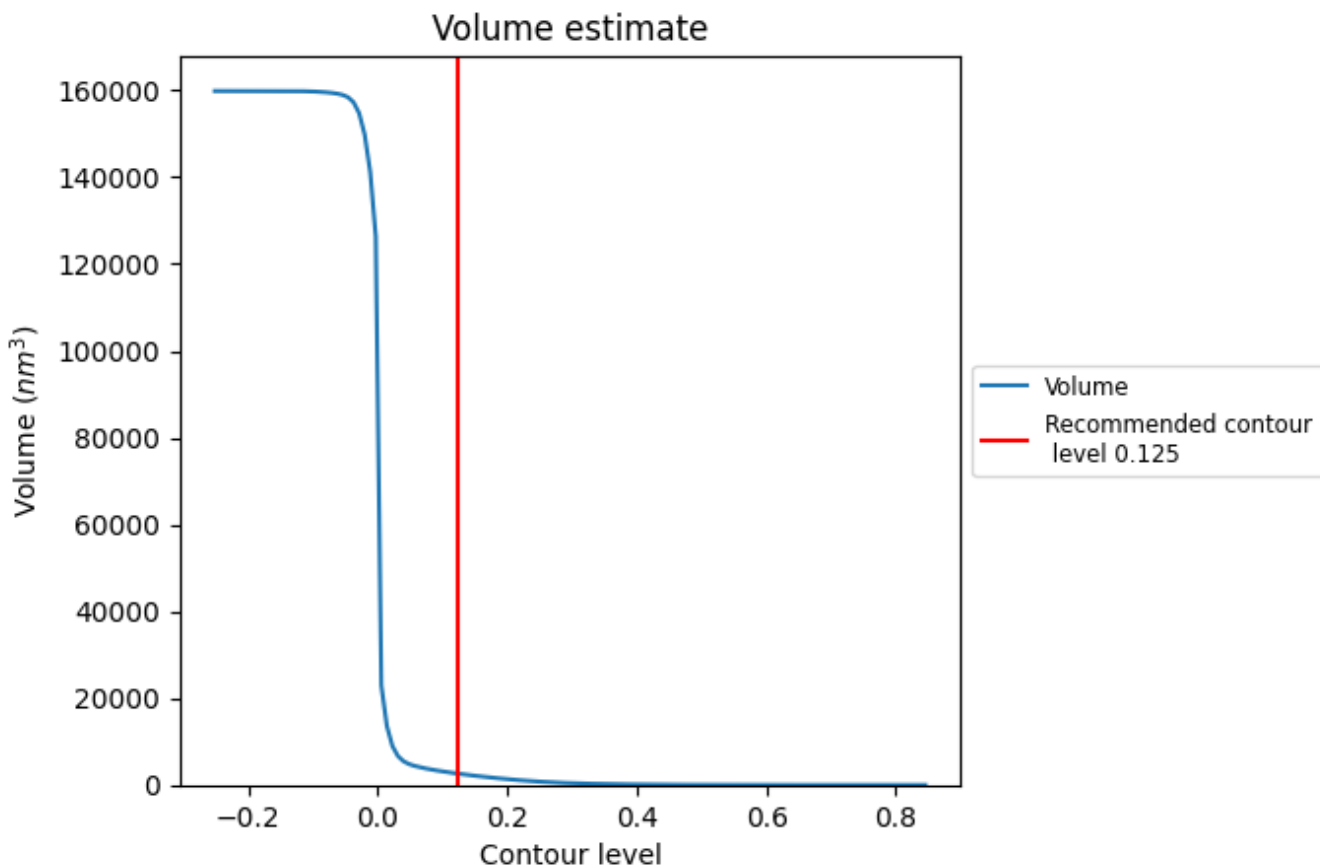
The volume at the recommended contour level is 2585 nm^3; this corresponds to an approximate mass of 2335 kDa.

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 ⓘ
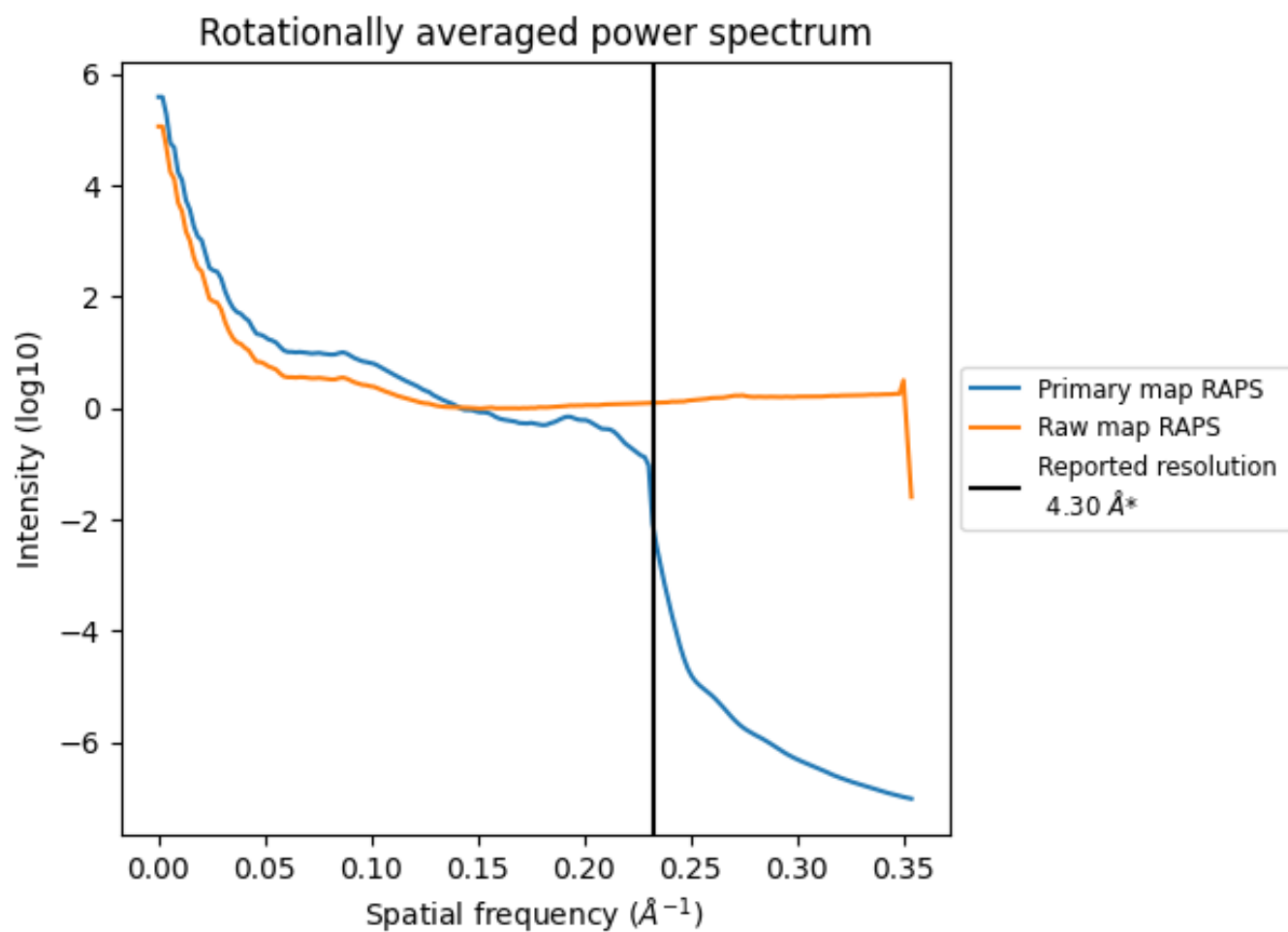
*Reported resolution corresponds to spatial frequency of 0.233 Å^{-1}

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)
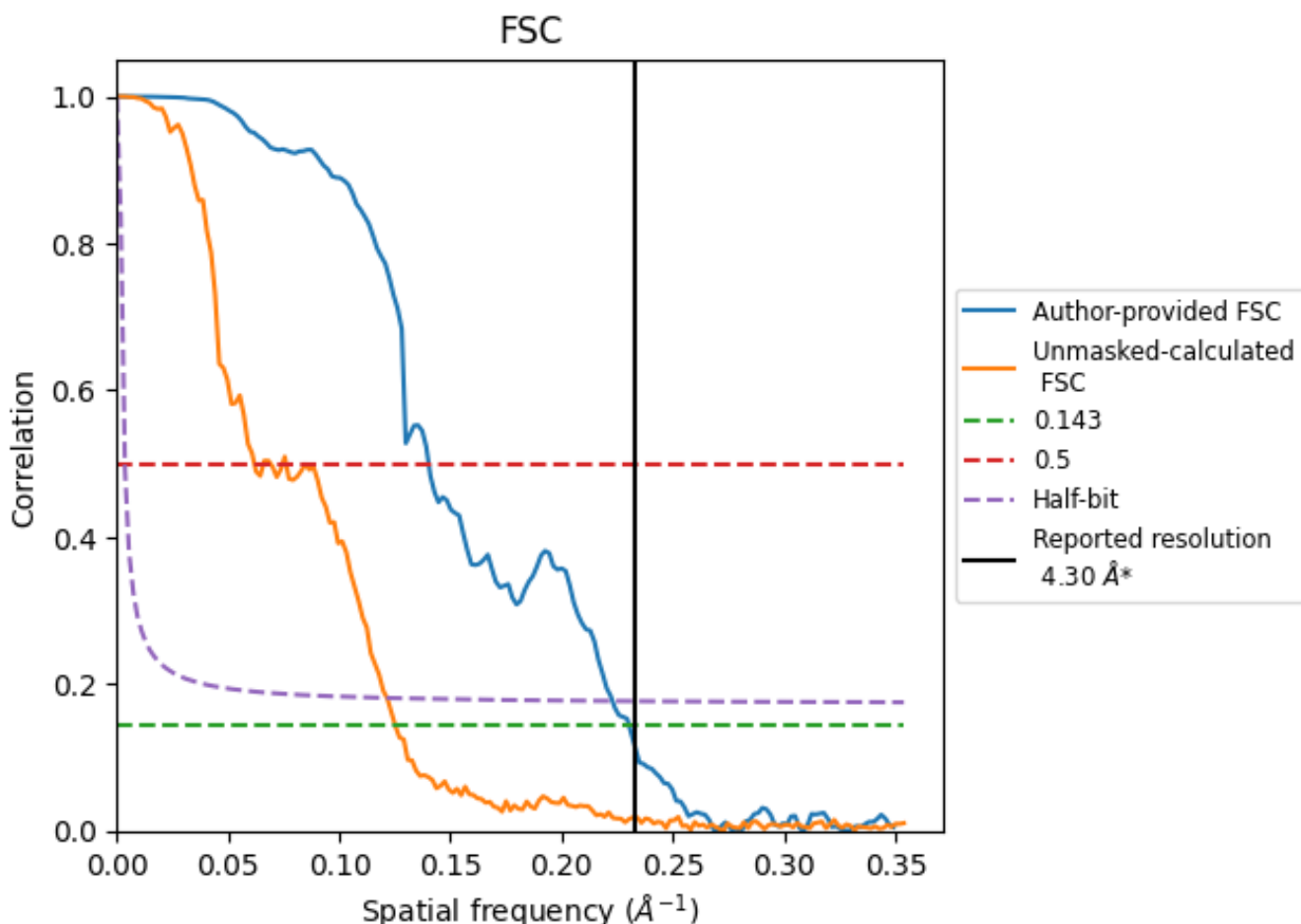
*Reported resolution corresponds to spatial frequency of 0.233 Å^{-1}

8.2 Resolution estimates ⓘ

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.30	-	-
Author-provided FSC curve	4.34	7.13	4.49
Unmasked-calculated*	7.99	16.18	8.23

*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 7.99 differs from the reported value 4.3 by more than 10 %

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-51019 and PDB model 9G3Z. Per-residue inclusion information can be found in section 3 on page 7.

9.1 Map-model overlay ⓘ

| X | Y | Z |
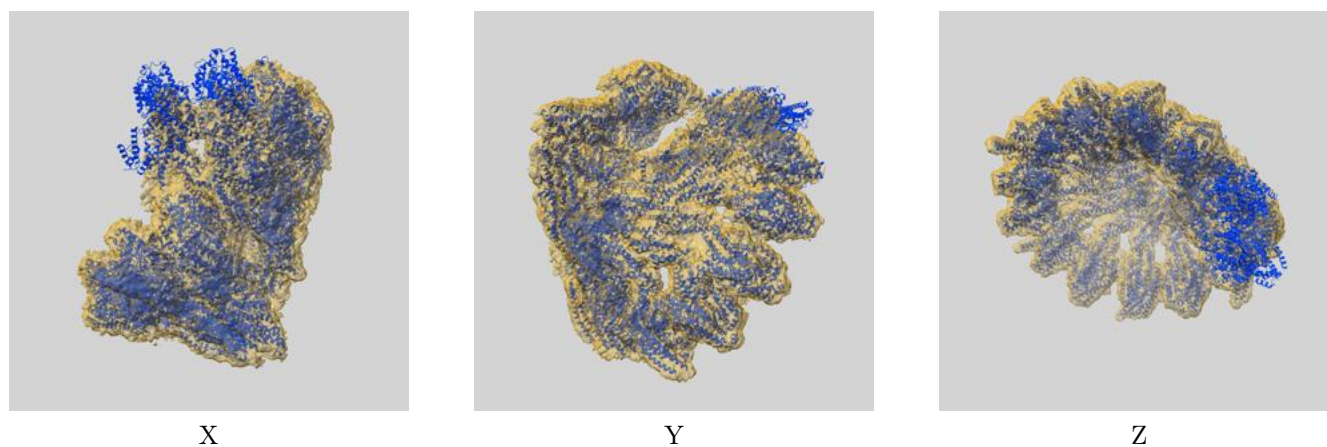
The images above show the 3D surface view of the map at the recommended contour level 0.125 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2   Q-score mapped to coordinate model ⓘ
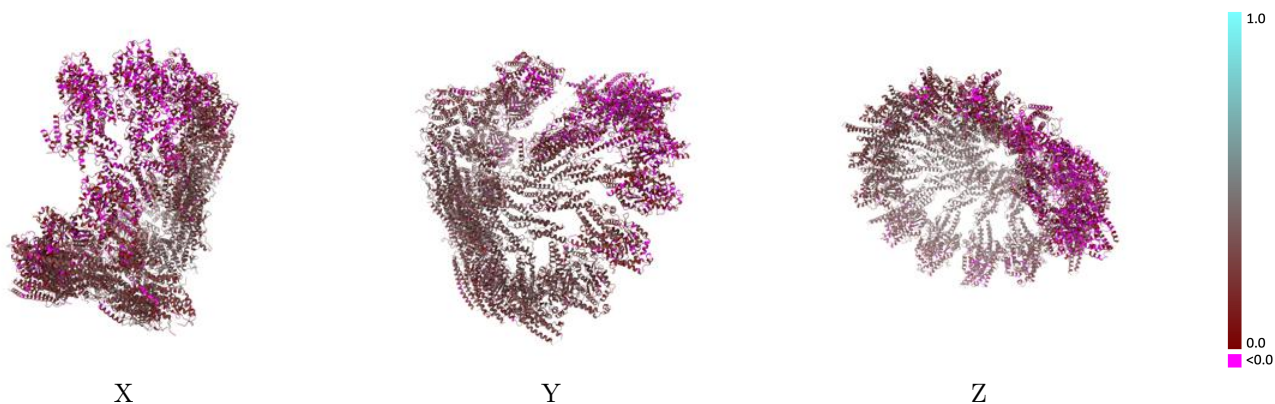
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 ⓘ
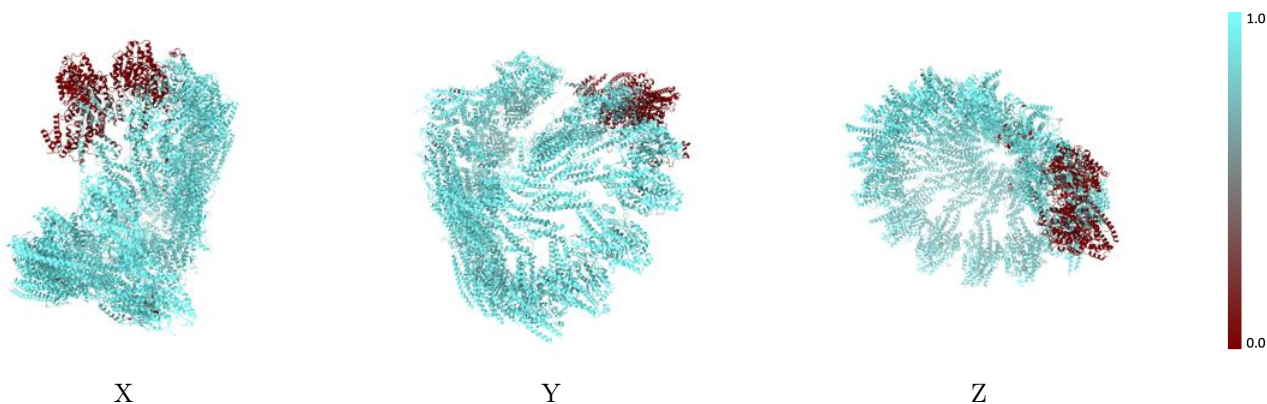
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.125).

9.4   Atom inclusion ⓘ
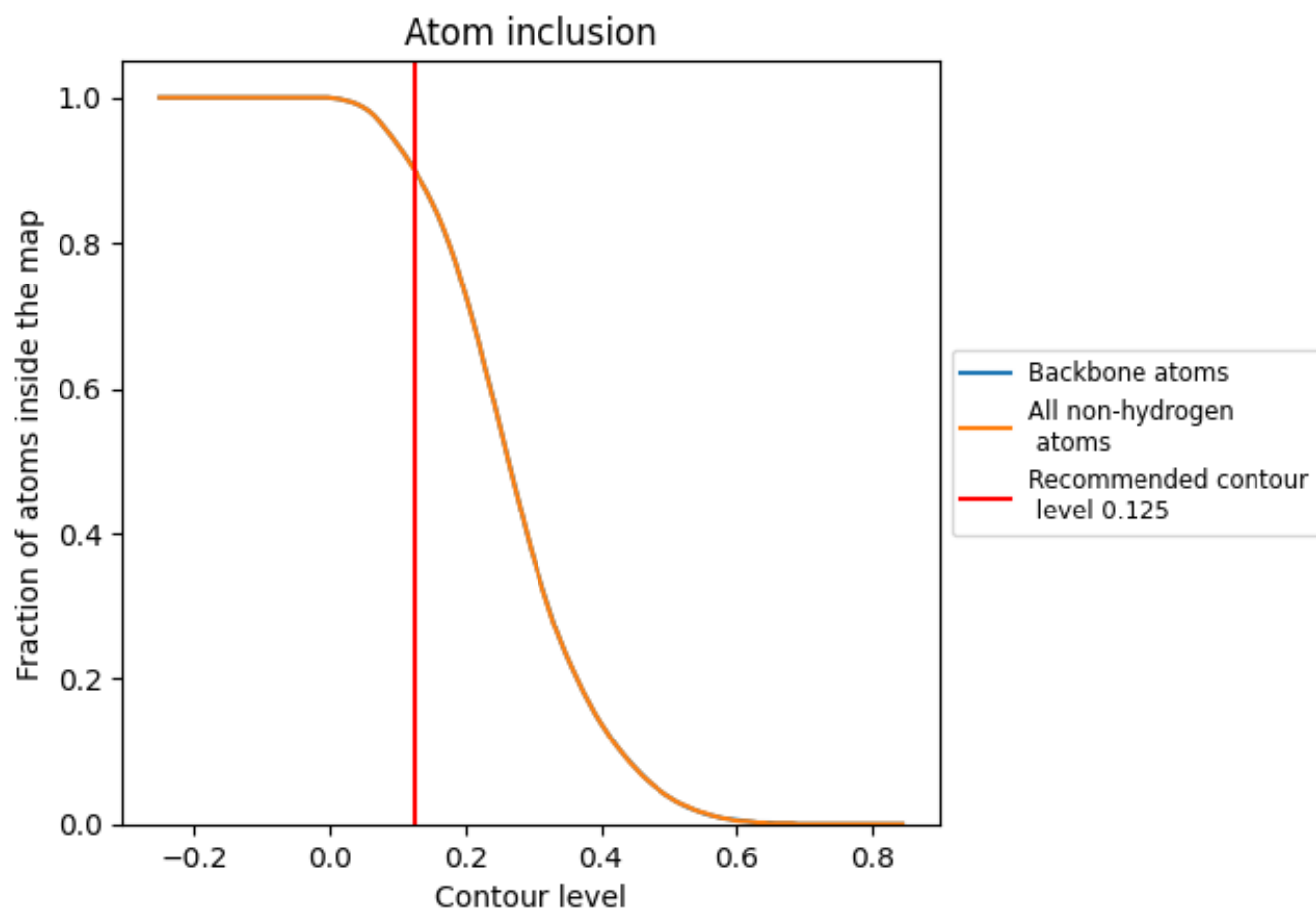
At the recommended contour level, 90% of all backbone atoms, 90% of all non-hydrogen atoms, are inside the map.

9.5　Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.125) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9000	0.2050
A	0.9730	0.1930
B	0.9930	0.2460
C	0.9750	0.2560
D	0.9950	0.2660
E	0.9970	0.2850
F	0.9980	0.2920
G	0.9970	0.3080
H	0.9970	0.3280
I	0.9980	0.3210
J	0.9930	0.2710
K	0.9990	0.2400
L	0.9780	0.1730
M	0.8300	0.0830
N	0.5200	0.0780
O	0.2550	0.1000
P	0.9880	0.3270
Q	0.9810	0.2500
Y	0.9880	0.1320
a	0.9900	0.1040
b	0.9840	0.1460
c	0.9720	0.1720
d	0.9900	0.1550
e	0.9870	0.1940
f	0.9910	0.2120
g	0.9950	0.2450
h	0.9980	0.3020
i	0.9990	0.2860
j	0.9910	0.1900
k	0.9850	0.1170
l	0.8240	0.0550
m	0.0430	0.0450
n	0.0710	0.0320
w	0.8610	-0.0210
x	0.9770	0.0520

1.0

0.0
<0.0