WORLDWIDE wwPDB PROTEIN DATA BANK

wwPDB EM Validation Summary Report (i)

Nov 20, 2022 – 03:29 PM EST

PDB ID	:	7ML3
EMDB ID	:	EMD-23907
Title	:	General transcription factor TFIIH (weak binding)
Authors	:	Yang, C.; Fujiwara, R.; Kim, H.J.; Gorbea Colon, J.J.; Steimle, S.; Garcia, B.A.; Murakami, K.
Deposited on	:	2021-04-27
Resolution	:	7.60 Å(reported)
Based on initial model	:	5OQJ

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 7.60 Å.

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

Metric	Percentile Ranks	Value
Clashscore		82
Ramachandran outliers		0.3%
Sidechain outliers		1.1%

Worse   *Better*

▮ Percentile relative to all structures

▯ Percentile relative to all EM structures
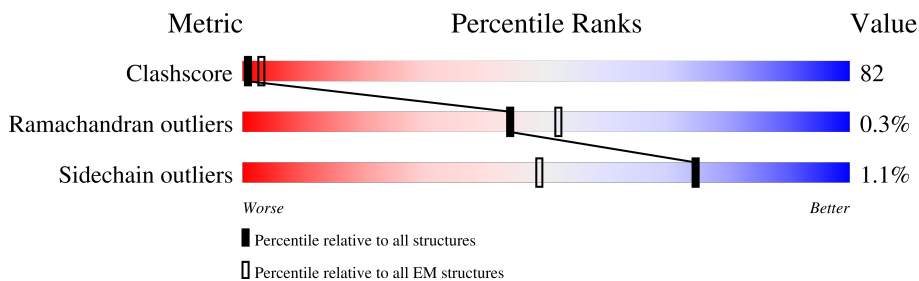
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	3	321	11% 23% 16% • 57%
2	2	513	13% 42% 44% •• 10%
3	0	778	8% 23% 69% 5% •
4	1	537	15% 41% 26% • 32%
5	4	338	8% 32% 49% • 16%
6	6	461	• 30% 42% • 24%
7	5	72	22% 19% 64% 8% 8%
8	7	843	11% 23% 38% • 35%

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Mol	Chain	Length	Quality of chain
9	N	30	10% / 13% / 87%
10	T	30	20% / 13% / 13% / 73%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
12	SF4	0	801	-	-	X	-

2 Entry composition ⓘ

There are 12 unique types of molecules in this entry. The entry contains 22648 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 BJ4_G0050160.mRNA.1.CDS.1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	3	138	Total 860	C 533	N 160	O 160	S 7	0	0

- Molecule 2 is a protein called RNA polymerase II transcription factor B subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	2	460	Total 3011	C 1856	N 562	O 584	S 9	0	0

- Molecule 3 is a protein called General transcription and DNA repair factor IIH helicase subunit XPD.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	0	754	Total 6108	C 3891	N 1032	O 1147	S 38	0	0

- Molecule 4 is a protein called Tfb1.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	1	367	Total 2411	C 1536	N 438	O 430	S 7	0	0

- Molecule 5 is a protein called General transcription and DNA repair factor IIH subunit TFB4.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	4	284	Total 2041	C 1310	N 343	O 376	S 12	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
4	113	UNK	ASP	conflict	UNP A0A7I9C5C2
4	114	UNK	MET	conflict	UNP A0A7I9C5C2

- Molecule 6 is a protein called General transcription and DNA repair factor IIH.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	6	351	Total 2527	C 1590	N 454	O 456	S 27	0	0

There are 13 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
6	412	UNK	ILE	conflict	UNP A0A7I9FQL5
6	413	UNK	LEU	conflict	UNP A0A7I9FQL5
6	414	UNK	LYS	conflict	UNP A0A7I9FQL5
6	415	UNK	ASN	conflict	UNP A0A7I9FQL5
6	416	UNK	HIS	conflict	UNP A0A7I9FQL5
6	417	UNK	LYS	conflict	UNP A0A7I9FQL5
6	418	UNK	ASN	conflict	UNP A0A7I9FQL5
6	419	UNK	ASP	conflict	UNP A0A7I9FQL5
6	420	UNK	LYS	conflict	UNP A0A7I9FQL5
6	421	UNK	LEU	conflict	UNP A0A7I9FQL5
6	422	UNK	LEU	conflict	UNP A0A7I9FQL5
6	423	UNK	THR	conflict	UNP A0A7I9FQL5
6	424	UNK	SER	conflict	UNP A0A7I9FQL5

- Molecule 7 is a protein called General transcription and DNA repair factor IIH subunit TFB5.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	5	66	Total 498	C 314	N 89	O 93	S 2	0	0

- Molecule 8 is a protein called General transcription and DNA repair factor IIH helicase subunit XPB.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	7	548	Total 3947	C 2438	N 729	O 757	S 23	0	0

- Molecule 9 is a DNA chain called non-template strand DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	N	30	Total 624	C 298	N 113	O 183	P 30	0	0

- Molecule 10 is a DNA chain called template strand DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	T	30	Total 606	C 291	N 108	O 177	P 30	0	0

- Molecule 11 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
11	3	2	Total 2	Zn 2	0
11	4	1	Total 1	Zn 1	0
11	6	4	Total 4	Zn 4	0

- Molecule 12 is IRON/SULFUR CLUSTER (three-letter code: SF4) (formula: Fe_4S_4).

Mol	Chain	Residues	Atoms			AltConf
12	0	1	Total 8	Fe 4	S 4	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: BJ4_G0050160.mRNA.1.CDS.1

• Molecule 2: RNA polymerase II transcription factor B subunit 2

Q332 D333 I334 S338 L339 I340 V341 E342 T343 N344 F345 K346 I347 Y348 S349 Y350 S351 N352 S353 P354 L355 Q356 I357 A358 V359 L360 S361 L362 F363 V364 H365 L366 K367 A368 R369 F370 V371 N372 M373 V374 L375 G376 Q377 I378 T379 R380 E381 S382 I383 R384 R385 A386 L387 T388 N389 G390 I391 T392 A393

D394 Q395 I396 I397 A398 Y399 L400 E401 T402 H403 A404 H405 P406 Q407 M408 R409 R410 L411 A412 E413 E414 K415 L416 E417 K418 K419 L420 E421 L422 D423 P424 N425 C426 K427 E428 P429 L430 Q431 V432 L433 P434 P435 T436 V437 Q440 W444 Q445 L448 D449 R450 V451 I452 T453 Y454 E455 G456 S457

L458 Y459 S460 D461 F462 E463 T464 S465 Q466 E467 Y468 N469 L470 L471 S472 K473 Y474 A475 Q476 D477 V480 L481 L482 W483 K484 D485 D486 K487 K488 K489 K490 F491 F492 I493 S494 K495 E496 G497 N498 S499 Q500 V501 L502 D503 F504 A505 K506 R507 LYS LEU LYS LYS GLN
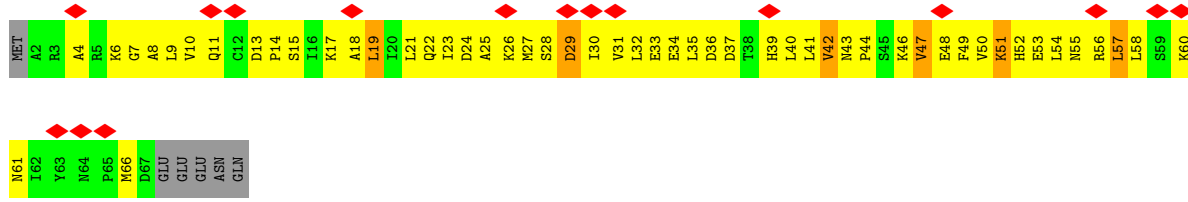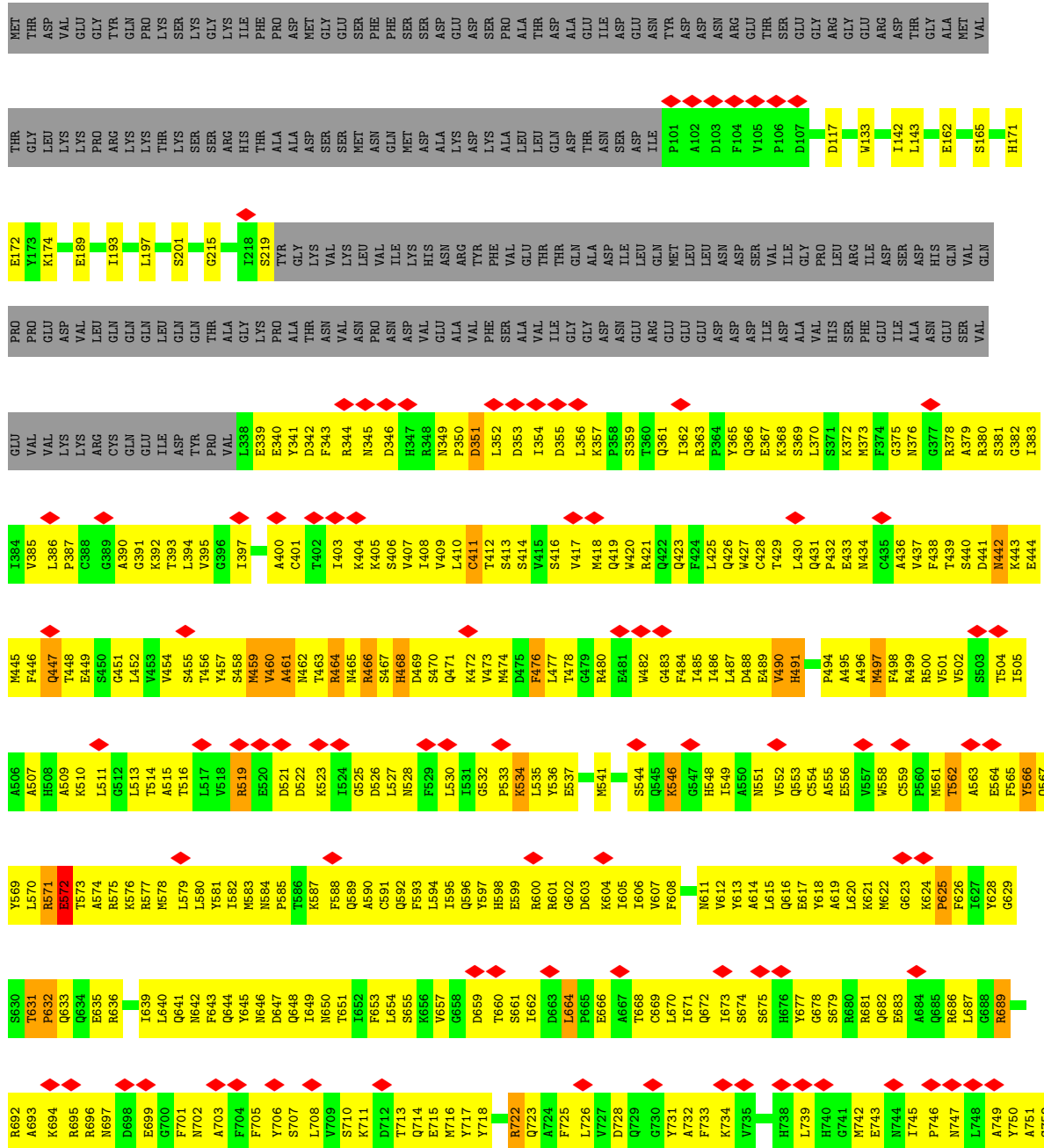
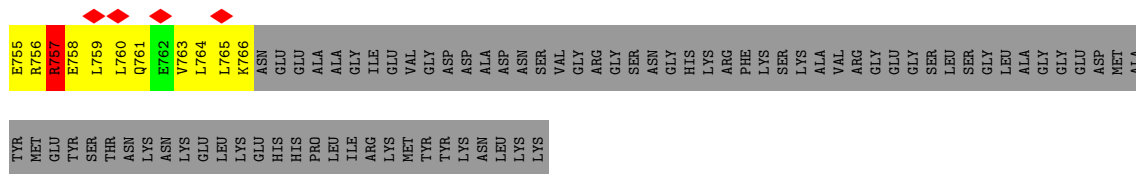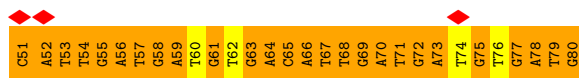• Molecule 3: General transcription and DNA repair factor IIH helicase subunit XPD

Chain 0:

8%
23%　　69%　　5% •

M1 K2 F3 Y4 I5 D6 D7 L8 P9 V10 L11 F12 P13 Y14 P15 K16 I17 P18 P19 E20 Q21 Y22 N23 Y24 M25 I28 K29 K30 T31 L32 D33 V34 G35 G36 N37 S38 I39 L40 E41 M42 P43 K48 T49 V50 S51 L52 L53 S54 L55 T56 I57 A58 Y59 Q60 M61 H62 Y63 P64

E65 H66 R67 K68 I69 I70 Y71 C72 S73 R74 T75 M76 S77 E78 I79 E80 K81 A82 L83 V84 E85 L86 E87 M90 D91 Y92 K95 E96 L97 G98 Y99 Q100 E101 D102 F103 R104 G105 L106 G107 L108 T109 S110 R111 K112 N113 L114 C115 L116 H117 P118 E119 V120 E123 R124 K125 V128

V129 D130 E131 K132 C133 R134 R135 M136 T137 N138 G139 Q140 R143 K144 L145 E146 E147 D148 P149 E150 A151 N152 V153 I154 L155 C156 E157 Y158 H159 E160 N161 L162 Y163 N164 I165 E166 V167 E168 D169 Y170 L171 P172 K173 G174 V175 F176 S177 F178 E179 K180 L181 L182 K183 Y184 C185 E186 E187 K188 T189

L190 C191 P192 Y193 F194 I195 V196 R197 R198 M199 I200 N204 I205 I206 I207 Y208 S209 Y210 H211 Y212 L213 L214 D215 P216 K217 I218 A219 E220 R221 V222 S223 N224 E225 V226 S227 K228 D229 S230 I231 V232 I233 F234 D235 E236 A237 H238 N239 I240 D241 C244 I245 E246 S247 L248 S249 L250 D251 L252

T253 T254 D255 A256 L257 R258 R259 A260 T261 R262 G263 A264 L267 R270 I271 S272 E273 V274 R275 K276 V277 D278 S279 Q280 K281 L282 Q283 D284 E285 Y286 E287 K288 L289 V290 Q291 G292 L293 H294 S295 A296 D297 I298 L299 T300 D301 Q302 E303 E304 P305 F306 V307 E308 T309 P310 V311 L312 P313 Q314

D315 L316 L317 T318 E319 A320 I321 P322 G323 N324 I325 R326 R327 A328 E329 H330 F331 V332 S333 F334 L335 K336 R337 L338 I339 E340 Y341 L342 K343 T344 R345 M346 K347 V348 L349 H350 V351 I352 S353 E354 T355 P356 K357 S358 F359 L360 Q361 H362 L363 K364 Q365 L366 I367 F368 I369 E370 R371 K372 P373 L374

R375 F376 C377 S378 E379 R380 L381 S382 L383 L384 V385 R386 T387 L388 E389 V390 T391 E392 V393 E394 D395 F396 T397 A398 L399 K400 D401 I402 A403 T404 F405 A406 T407 L408 I409 S410 T411 Y412 E413 E414 G415 F416 L417 L418 I419 K420 E421 P422 Y423 E424 I425 E426 N427 A428 A429 V430 P431 N432 P433 I434

M435 R436 F437 T438 C439 L440 D441 A442 S443 I444 A445 I446 K447 P448 V449 R452 F453 S454 S455 V456 I457 I458 T459 S460 G461 T462 I463 S464 P465 L466 D467 M468 Y469 P470 R471 M472 L473 N474 F475 K476 T477 V478 L479 Q480 K481 S482 Y483 A484 M485 T486 A487 A488 K489 K490 S491 F492 L493 P494 M495

I496 I497 T498 K499 G500 S501 D502 Q503 V504 A505 I506 S507 S508 R509 F510 E511 I512 R513 N514 D515 P516 S517 I518 V519 R520 N521 Y522 G523 S524 M525 E528 F529 A530 K531 I532 T533 P534 D535 G536 M537 V538 V539 F540 F541 Y544 L545 Y546 M547 E548 V551 S552 M553 W554 Q555 T556 E562

V563 W564 K565 H566 K567 L568 I569 L570 V571 E572 T573 P574 D575 A576 Q577 E578 T579 S580 E584 T585 Y586 R587 K588 A589 C590 S591 N592 G593 R594 G595 A596 I597 L598 L599 S600 V601 A602 R603 S607 E608 G609 I610 D611 H614 Q615 Y616 G617 R618 T619 V620 L621 M622 I623 G624 I625 P626 F627

Q628 Y629 T630 E631 S632 R633 I634 L635 K636 A637 R638 L639 E640 F641 M642 R643 E644 N645 Y646 R647 I648 R649 E650 N651 D652 F653 L654 S655 F656 D657 A658 M659 R660 H661 A662 A663 Q664 C665 L666 G667 R668 V669 L670 R671 G672 K673 D674 D675 Y676 G677 V678 M679 V680 L681 A682 D683 R684 R685 F686

K689 Q692 L693 P694 K695 W696 I697 A698 Q699 G700 D703 A704 D705 L706 N707 L708 S709 T710 D711 M712 A713 I714 S715 K718 Q719 F720 L721 R722 M724 A725 T728 D729 P730 K731 D732 W738 W739 S740 Y741 E742 D743 L744 I745 K746 H747 Q748 N749 S750 R751 K752 D753 Q754 GLY GLY

PHE ILE GLU GLU ASN GLU GLY GLU GLN ASP ASP GLU GLU ASP GLU ILE GLU MET GLN

• Molecule 4: Tfb1

Chain 1:

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

ARG ARG ARG GLU GLU SER ALA GLN HIS THR GLU THR PRO MET SER SER SER SER VAL THR ALA GLY THR PRO THR PRO HIS LEU ASP THR PRO GLN LEU ASN ASN GLY ALA PRO LEU ILE ASN THR ALA LYS LEU ASP ASP S168 K173 L174 L175 L180 Q181 Q182 L185 N188

K189 V190 L191 M192 K193 V194 F195 Q196 E197 T198 V199 I200 N201 L204 P205 P206 F209 W210 S211 T212 R213 I214 P215 R218 X219 F220 A221 L222 S225 X228 G229 P230 X235 X236 X237 X238 P239 X240 X241 X247 X248 X249 R253 E254 K255 I256 L257 N258 I259 F260 E261 N262

I265 V266 K267 K268 A269 Y270 T271 D272 N273 V274 P275 K276 N277 F278 K279 E280 P281 E282 F283 W284 F287 F288 S289 S290 K291 L292 K295 L296 X297 X298 X299 X300 X301 X302 X305 X306 X307 X308 X309 X310 X311 X312 X313 X314 L315 X316 X320 X325 X326 X327 X328 L329 L330 H331

P332 V333 K334 K335 I336 I337 X338 L339 D340 G341 N342 I343 X344 D345 D346 P347 V348 V349 R350 G351 X352 X353 X354 X355 X368 X369 X370 I374 L375 M378 N379 E383 K384 M385 I386 M387 X388 L389 X465 X466 X467 X468 X469 X470 X479 X482 X483 X484 X485 X486 X487 X491 X492

X493 X494 X495 X496 X500 X501 R502 V503 I504 T505 X506 I507 K508 I509 N510 A511 X512 Q513 E537 V538 P543 R551 T556 C557 C558 E559 F560 L561 K562 F563 F564 A565 I566 H567 Q573 K574 S577 K587 L593 N594 E595 L596 F597 V600 L601 N602 G603 E606 S609

N610 Y615 L620 K629 Y630 D631 N635 E636 Y637 N638 N639 ASN SER ASN

• Molecule 5: General transcription and DNA repair factor IIH subunit TFB4

Chain 4:

MET ASP ALA ILE SER ASP PRO THR PHE LYS HIS ALA ARG SER ARG LYS GLN VAL THR GLU GLU S22 P23 S24 L25 L26 T27 V28 I29 I30 E31 I32 A33 P34 W37 T38 T39 F40 E43 G44 N45 E46 K47 K52 V53 L54 E55 A56 L57 I58 V59 F60 L61 N62 A63 H64

• Molecule 6: General transcription and DNA repair factor IIH

Chain 6: 30% 42% • 24%

• Molecule 7: General transcription and DNA repair factor IIH subunit TFB5

Chain 5: 22% 19% 64% 8% 8%

MET A2 R3 A4 R5 K6 G7 A8 L9 V10 Q11 C12 D13 P14 S15 I16 K17 A18 L19 I20 L21 Q22 I23 D24 A25 K26 M27 S28 D29 I30 V31 L32 E33 E34 L35 D36 D37 T38 H39 L40 L41 V42 N43 P44 S45 K46 V47 E48 F49 V50 K51 H52 E53 L54 N55 R56 L57 L58 S59 K60

N61 I62 Y63 N64 P65 M66 D67 GLU GLU ASN GLN

• Molecule 8: General transcription and DNA repair factor IIH helicase subunit XPB

Chain 7:

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

THR GLY LEU LYS LYS PRO ARG LYS LYS THR LYS SER SER ARG HIS THR ALA ALA ASP SER SER MET ASN GLN GLN MET ASP ALA LYS ALA LEU LEU GLN ASP ASN ALA ASP ILE P101 A102 D103 F104 V105 P106 D107 D117 W133 I142 L143 E162 S165 H171

E172 Y173 K174 E189 I193 L197 S201 G215 I218 S219 TYR GLY LYS VAL LYS LEU VAL ILE LYS HIS ASN ARG TYR PHE VAL GLU THR THR GLN ALA ASP VAL ILE LEU GLN ASP ARG GLU GLU GLU ASP ASP ILE ASP ALA VAL HIS SER PHE GLU ILE ALA ASN GLU SER VAL

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

GLU VAL VAL LYS LYS ARG CYS GLN GLN ILE ASP TYR PRO VAL L338 E339 E340 Y341 D342 F343 R344 N345 D346 H347 R348 N349 P350 D351 L352 D353 I354 D355 L356 K357 P358 S359 T360 Q361 I362 R363 P364 Y365 Q366 E367 K368 S369 L370 S371 K372 M373 F374 G375 N376 G377 R378 A379 R380 S381 G382 I383

I384 V385 L386 P387 C388 G389 A390 G391 K392 T393 L394 V395 G396 I397 A400 C401 T402 I403 K404 K405 S406 V407 I408 V409 L410 C411 T412 S413 S414 V415 S416 V417 M418 Q419 W420 R421 Q422 Q423 F424 L425 Q426 W427 C428 T429 L430 Q431 P432 E433 N434 C435 A436 V437 F438 T439 S440 D441 N442 K443 E444

M445 F446 Q447 T448 E449 S450 G451 L452 V453 V454 S455 T456 Y457 S458 M459 V460 A461 N462 T463 R464 N465 R466 S467 H468 D469 S470 Q471 K472 V473 M474 D475 F476 L477 T478 G479 R480 E481 W482 Q483 F484 I485 I486 L487 D488 E489 V490 H491 P494 A495 A496 M497 F498 R499 R500 V501 V502 S503 T504 I505

A506 A507 H508 A509 K510 L511 G512 L513 T514 A515 T516 L517 V518 R519 E520 D521 D522 K523 I524 G525 D526 L527 N528 F529 L530 I531 G532 P533 K534 L535 Y536 E537 M541 S544 Q545 K546 G547 H548 I549 A550 N551 V552 Q553 C554 A555 E556 V557 W558 C559 P560 M561 T562 A563 E564 F565 Y566 Q567 E568

Y569 L570 R571 E572 T573 A574 R575 K576 R577 M578 L579 L580 Y581 I582 M583 N584 P585 T586 K587 F588 Q589 A590 C591 Q592 F593 L594 I595 Q596 Y597 H598 E599 R600 R601 G602 D603 K604 I605 I606 V607 F608 N611 V612 Y613 A614 L615 Q616 E617 Y618 A619 L620 K621 M622 G623 K624 P625 F626 I627 Y628 G629

S630 T631 P632 Q633 Q634 E635 R636 I639 L640 Q641 N642 F643 Q644 Y645 N646 D647 Q648 I649 N650 T651 I652 F653 L654 S655 K656 V657 G658 D659 T660 S661 I662 D663 L664 P665 E666 A667 T668 C669 L670 I671 Q672 I673 S674 S675 H676 Y677 G678 S679 R680 R681 Q682 E683 A684 Q685 R686 L687 G688 R689

R692 A693 K694 R695 R696 N697 D698 E699 G700 F701 N702 A703 F704 F705 Y706 S707 L708 V709 S710 K711 D712 T713 Q714 E715 M716 Y717 Y718 R722 Q723 A724 Y725 L726 V727 D728 Q729 G730 Y731 A732 F733 K734 V735 H738 L739 H740 G741 M742 E743 N744 I745 P746 N747 L748 A749 Y750 A751 S752 P753 R754

E755 R756 R757 E758 L759 L760 Q761 E762 V763 L764 L765 K766 ASN GLU GLU ALA ALA GLY ILE GLU VAL GLY ASP ASP ALA ASP ASN SER VAL GLY ARG GLY SER ASN GLY HIS LYS ARG PHE LYS SER LYS ALA VAL ARG GLY GLU GLY SER LEU SER GLY LEU ALA GLY GLY GLU ASP MET ALA

TYR MET GLU TYR SER THR ASN LYS ASN LYS GLU LEU LYS GLU HIS HIS PRO LEU ILE ARG LYS MET TYR TYR LYS ASN LEU LYS LYS

• Molecule 9: non-template strand DNA

Chain N:

10%

13%   87%

C51 A52 T53 T54 G55 A56 T57 G58 A59 T60 G61 T62 G63 A64 C65 A66 T67 T68 G69 A70 T71 G72 A73 T74 G75 T76 G77 A78 T79 G80

• Molecule 10: template strand DNA

Chain T:

20%

13%   13%   73%

C86 A87 T88 C89 A90 C91 A92 T93 C94 A95 T96 C97 A98 A99 T100 G101 T102 C103 A104 C105 A106 T107 C108 A109 T110 C111 A112 A113 T114 G115

4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	101497	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	45	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.072	Depositor
Minimum map value	0.000	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.004	Depositor
Recommended contour level	0.018	Depositor
Map size (Å)	273.47998, 273.47998, 272.41998	wwPDB
Map dimensions	258, 258, 257	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.06, 1.06, 1.06	Depositor

5   Model quality ⓘ

5.1   Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, SF4

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	3	1.27	6/870 (0.7%)	0.84	7/1190 (0.6%)
2	2	1.03	19/3057 (0.6%)	1.20	16/4071 (0.4%)
3	0	0.81	27/6226 (0.4%)	0.79	23/8407 (0.3%)
4	1	0.62	7/1896 (0.4%)	0.60	2/2543 (0.1%)
5	4	0.84	8/2062 (0.4%)	0.77	8/2805 (0.3%)
6	6	1.04	14/2506 (0.6%)	0.84	6/3402 (0.2%)
7	5	0.73	3/502 (0.6%)	1.00	5/677 (0.7%)
8	7	1.06	29/4017 (0.7%)	1.13	32/5374 (0.6%)
9	N	2.51	44/700 (6.3%)	2.68	55/1081 (5.1%)
10	T	2.75	36/678 (5.3%)	2.77	48/1041 (4.6%)
All	All	1.12	193/22514 (0.9%)	1.15	202/30591 (0.7%)

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
1	3	0	2
2	2	0	4
3	0	0	2
5	4	0	2
6	6	0	2
8	7	0	8
All	All	0	20

The worst 5 of 193 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	3	34	CYS	CB-SG	-30.99	1.29	1.82
6	6	366	CYS	CB-SG	-24.74	1.40	1.82

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	2	504	PHE	CE1-CZ	-22.91	0.93	1.37
6	6	426	ARG	CZ-NH2	21.06	1.60	1.33
8	7	572	GLU	CG-CD	19.68	1.81	1.51

The worst 5 of 202 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	2	286	ARG	NE-CZ-NH2	-49.68	95.46	120.30
8	7	757	ARG	NE-CZ-NH1	27.93	134.26	120.30
10	T	102	DT	O4'-C1'-N1	26.90	126.83	108.00
10	T	92	DA	O4'-C1'-N9	26.29	126.41	108.00
10	T	106	DA	O4'-C1'-N9	26.22	126.35	108.00

There are no chirality outliers.

5 of 20 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	2	286	ARG	Sidechain
2	2	468	TYR	Sidechain
2	2	68	SER	Peptide
1	3	71	GLN	Peptide
1	3	75	ASP	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	3	860	0	621	127	0
2	2	3011	0	2600	427	0
3	0	6108	0	6165	1150	0
4	1	2411	0	1882	220	0
5	4	2041	0	1954	302	0
6	6	2527	0	2321	404	0
7	5	498	0	506	129	0
8	7	3947	0	3575	814	0
9	N	624	0	342	87	0
10	T	606	0	339	44	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
11	3	2	0	0	0	0
11	4	1	0	0	0	0
11	6	4	0	0	0	0
12	0	8	0	0	4	0
All	All	22648	0	20305	3535	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 82.

The worst 5 of 3535 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:2:501:VAL:HA	2:2:504:PHE:CE2	1.33	1.63
3:0:614:HIS:CE1	3:0:675:ASP:HA	1.28	1.61
2:2:380:ARG:HH11	2:2:444:TRP:CB	1.16	1.57
8:7:757:ARG:CD	8:7:757:ARG:NE	1.68	1.51
8:7:572:GLU:CD	8:7:572:GLU:CG	1.81	1.47

There are no symmetry-related clashes.

5.3   Torsion angles (i)

5.3.1   Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	3	136/321 (42%)	110 (81%)	24 (18%)	2 (2%)	10	46
2	2	456/513 (89%)	378 (83%)	78 (17%)	0	100	100
3	0	752/778 (97%)	657 (87%)	94 (12%)	1 (0%)	51	86
4	1	256/537 (48%)	223 (87%)	30 (12%)	3 (1%)	13	50
5	4	279/338 (82%)	218 (78%)	61 (22%)	0	100	100
6	6	336/461 (73%)	278 (83%)	55 (16%)	3 (1%)	17	57

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
7	5	64/72 (89%)	50 (78%)	14 (22%)	0	100	100
8	7	544/843 (64%)	469 (86%)	75 (14%)	0	100	100
All	All	2823/3863 (73%)	2383 (84%)	431 (15%)	9 (0%)	44	77

5 of 9 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	1	230	PRO
6	6	116	THR
6	6	411	PRO
4	1	389	LEU
4	1	239	PRO

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	3	53/303 (18%)	52 (98%)	1 (2%)	57	75
2	2	258/468 (55%)	253 (98%)	5 (2%)	57	75
3	0	686/707 (97%)	685 (100%)	1 (0%)	93	97
4	1	169/395 (43%)	167 (99%)	2 (1%)	71	83
5	4	198/298 (66%)	198 (100%)	0	100	100
6	6	247/406 (61%)	241 (98%)	6 (2%)	49	69
7	5	53/66 (80%)	53 (100%)	0	100	100
8	7	379/737 (51%)	371 (98%)	8 (2%)	53	72
All	All	2043/3380 (60%)	2020 (99%)	23 (1%)	74	84

5 of 23 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
6	6	366	CYS
8	7	541	MET

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Mol	Chain	Res	Type
8	7	534	LYS
8	7	546	LYS
3	0	649	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 37 such sidechains are listed below:

Mol	Chain	Res	Type
8	7	442	ASN
8	7	644	GLN
8	7	447	GLN
8	7	528	ASN
5	4	64	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 8 ligands modelled in this entry, 7 are monoatomic - leaving 1 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	$\#|Z| > 2$
12	SF4	0	801	3	0,12,12	-	-	-		

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
12	SF4	0	801	3	-	-	0/6/5/5

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
12	0	801	SF4	4	0

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
4	1	4

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	1	393:UNK	C	465:UNK	N	85.89
1	1	519:UNK	C	537:GLU	N	12.88
1	1	355:UNK	C	368:UNK	N	12.28
1	1	567:HIS	C	573:GLN	N	4.45

6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-23907. These allow visual inspection of the internal detail of the map and identification of artifacts.

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

6.1 Orthogonal projections ⓘ

6.1.1 Primary map

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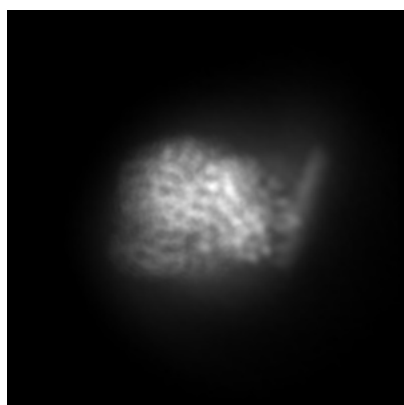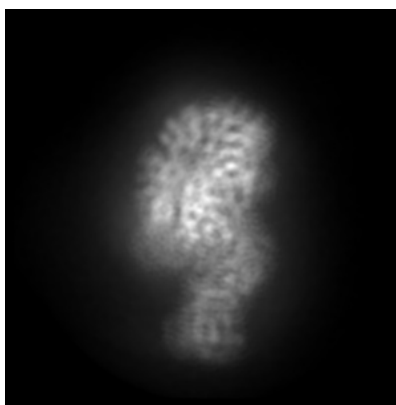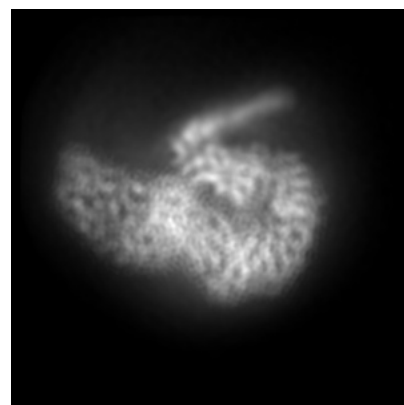
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ
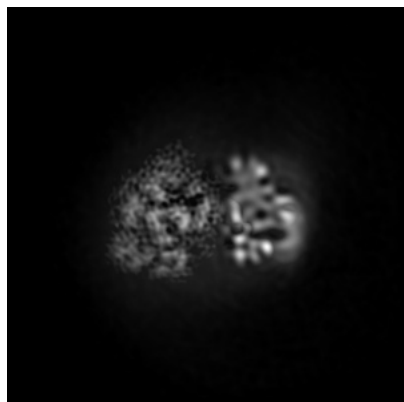
6.2.1 Primary map
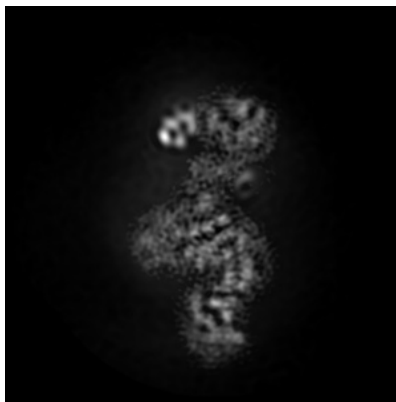
| X Index: 129 | Y Index: 129 | Z Index: 128 |
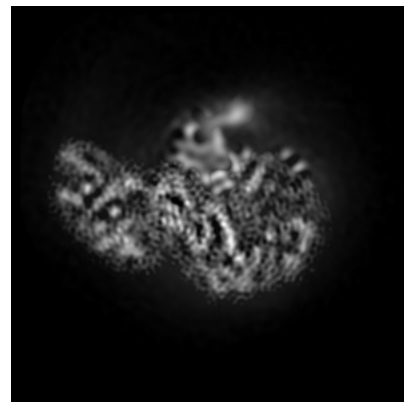
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices ⓘ
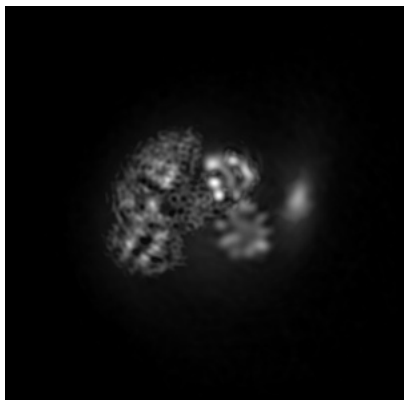
6.3.1 Primary map
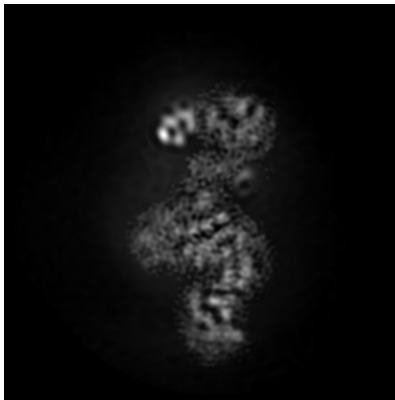
| X Index: 147 | Y Index: 129 | Z Index: 133 |
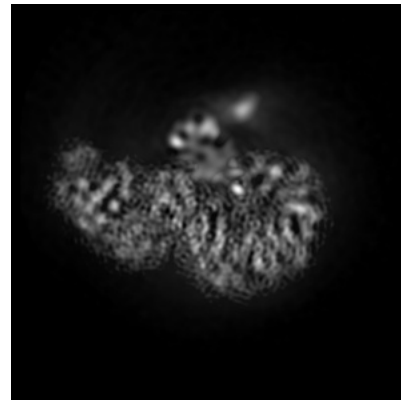
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal surface views ⓘ
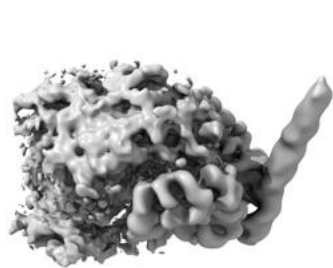
6.4.1 Primary map

| X | Y | Z |
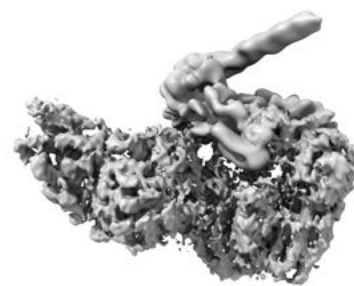
The images above show the 3D surface view of the map at the recommended contour level 0.018. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

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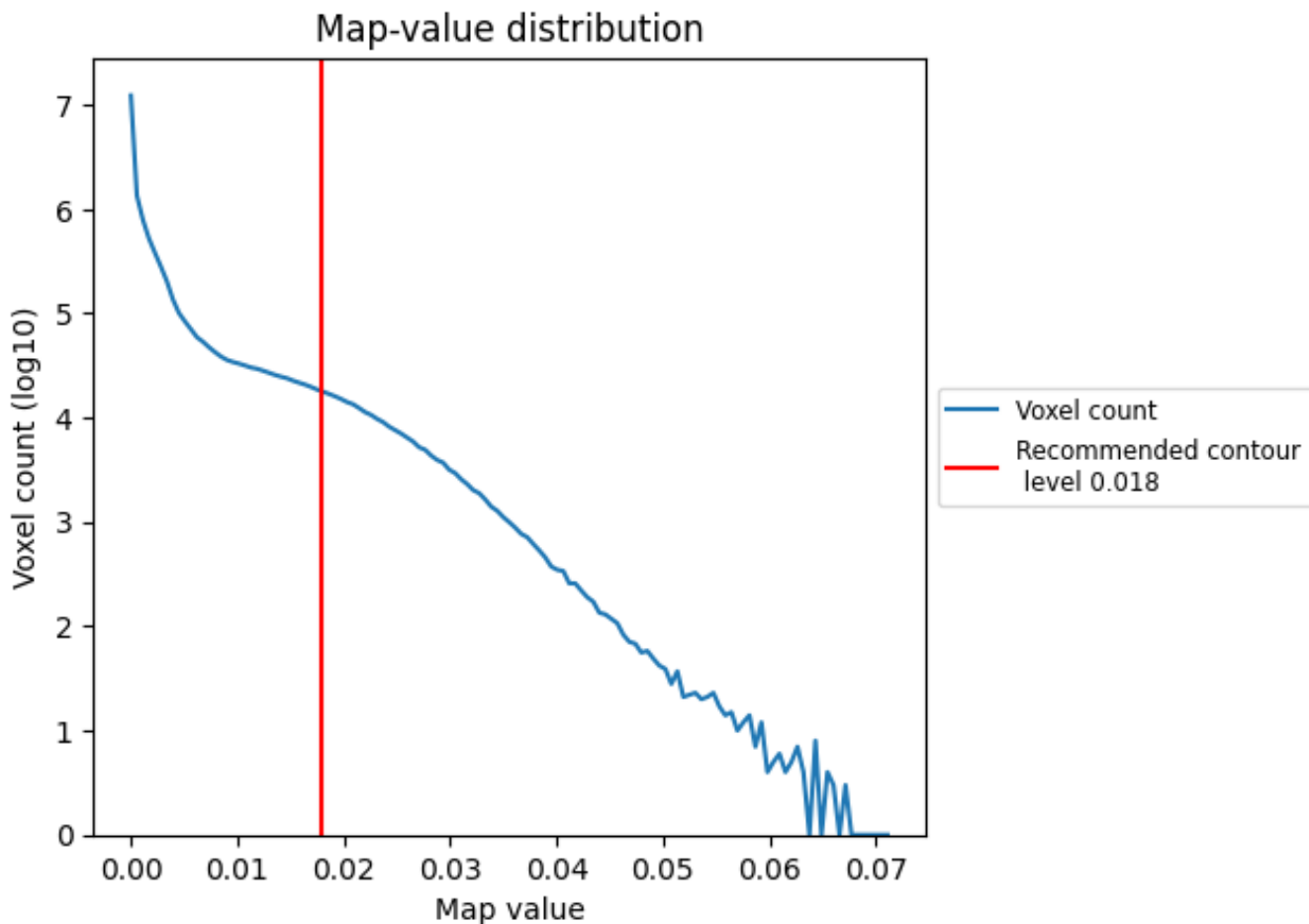
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2 Volume estimate (i)
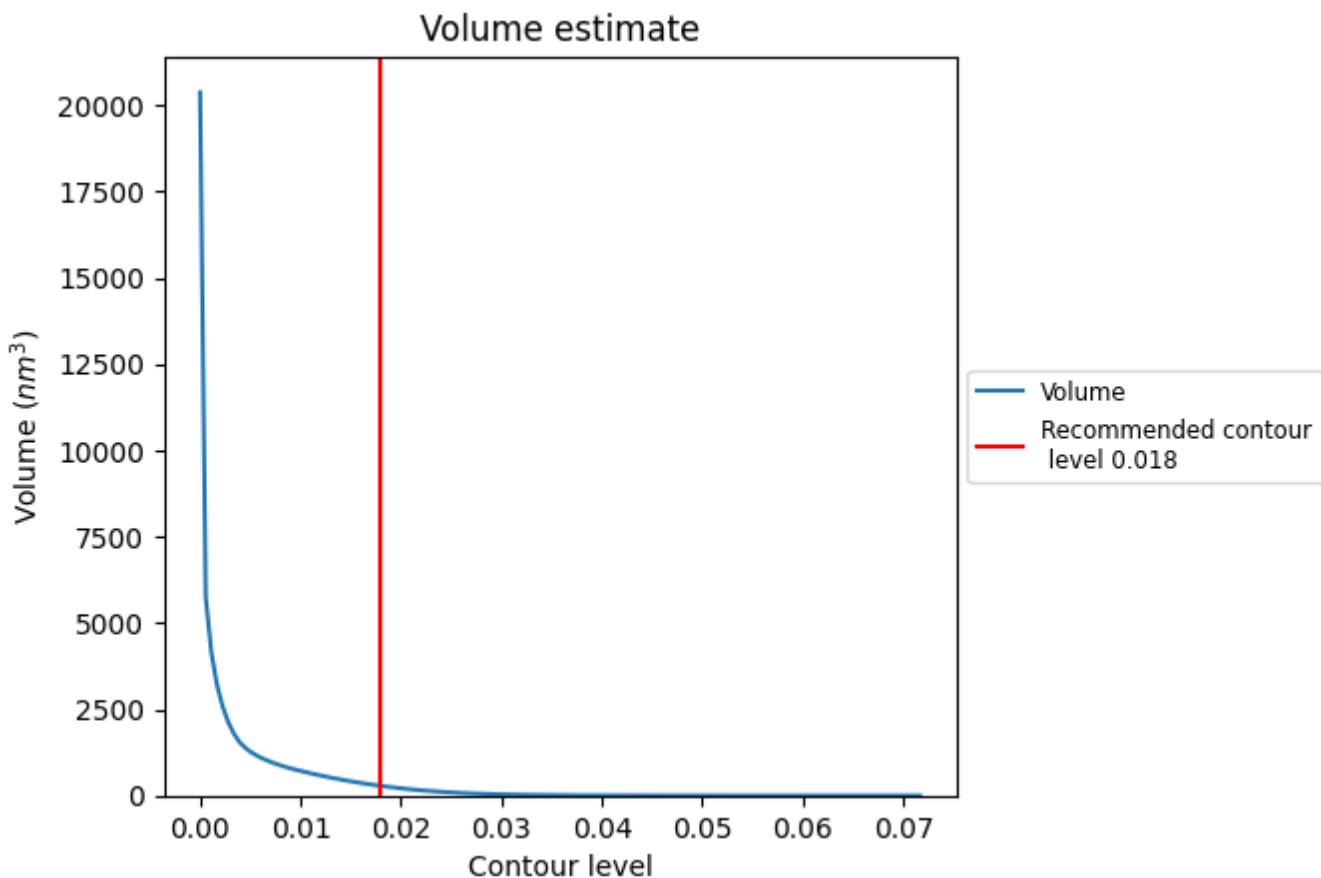
The volume at the recommended contour level is 279 nm^3; this corresponds to an approximate mass of 252 kDa.

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)

This section was not generated. The rotationally averaged power spectrum is only generated for cubic maps.

8 Fourier-Shell correlation ⓘ

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

8.1 FSC ⓘ
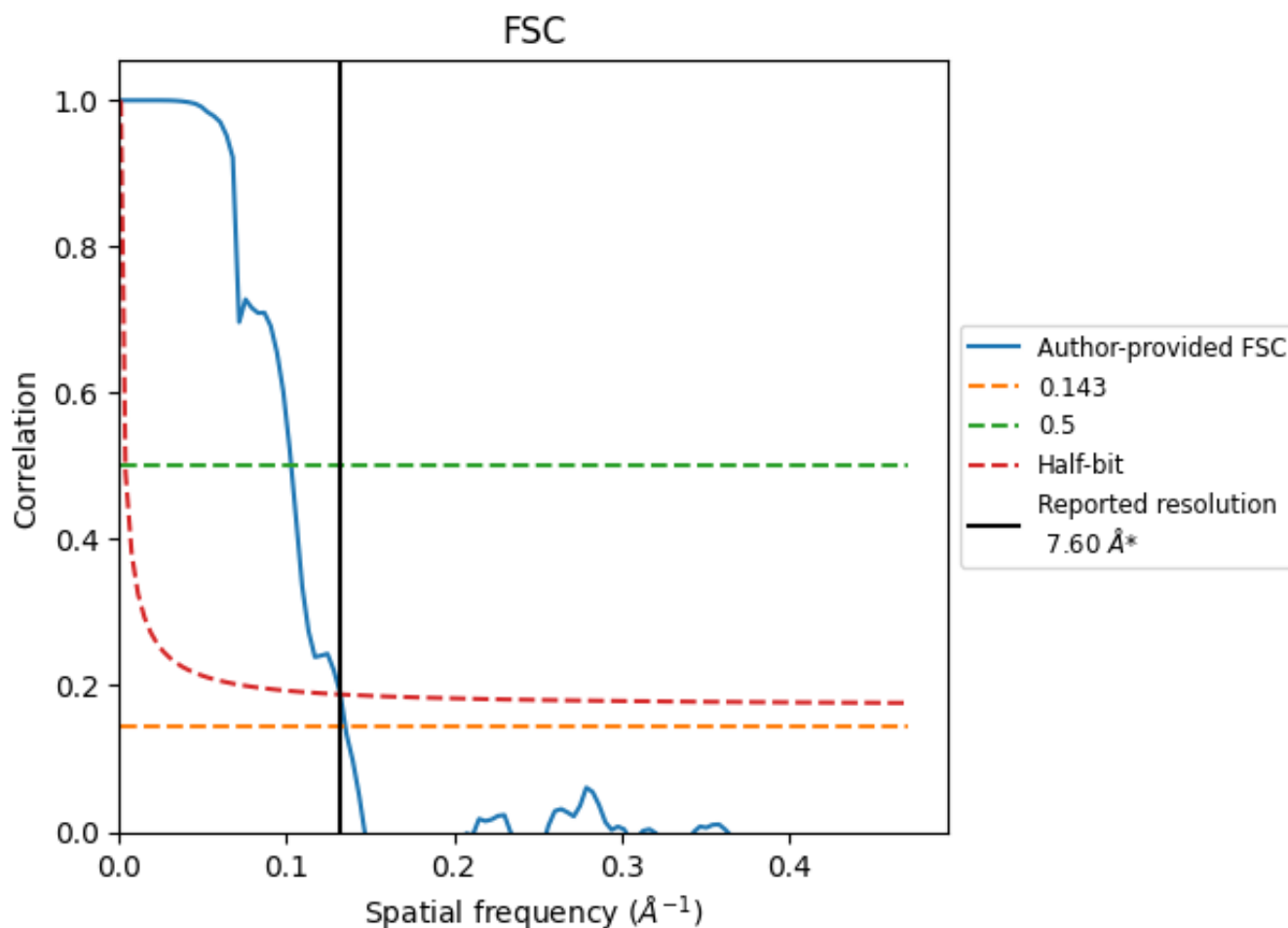
*Reported resolution corresponds to spatial frequency of 0.132 Å^{-1}

8.2 Resolution estimates (i)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	7.60	-	-
Author-provided FSC curve	7.40	9.73	7.56
Unmasked-calculated*	-	-	-

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

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-23907 and PDB model 7ML3. Per-residue inclusion information can be found in section 3 on page 7.

9.1 Map-model overlay ⓘ

| X | Y | Z |
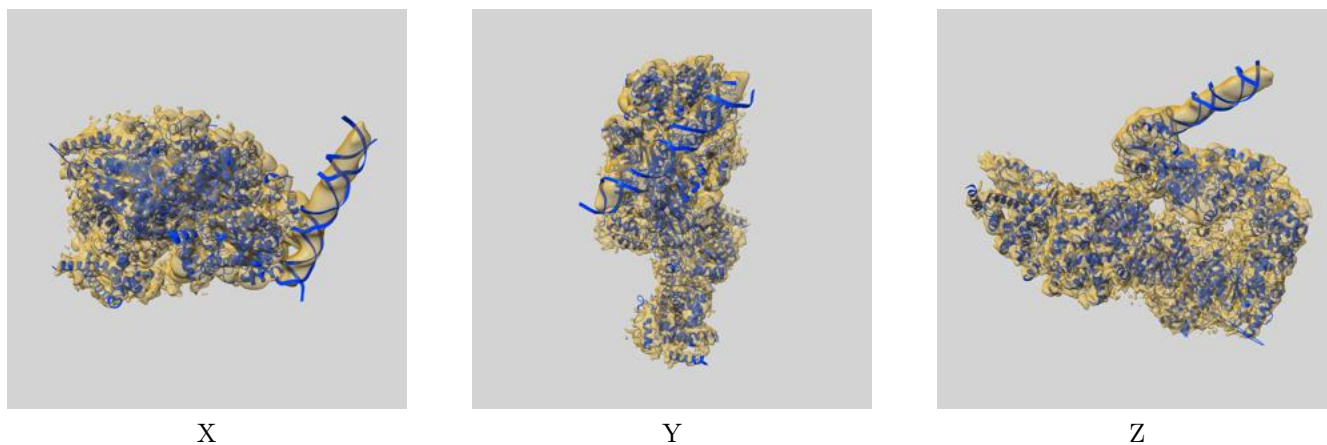
The images above show the 3D surface view of the map at the recommended contour level 0.018 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2　Q-score mapped to coordinate model ⓘ
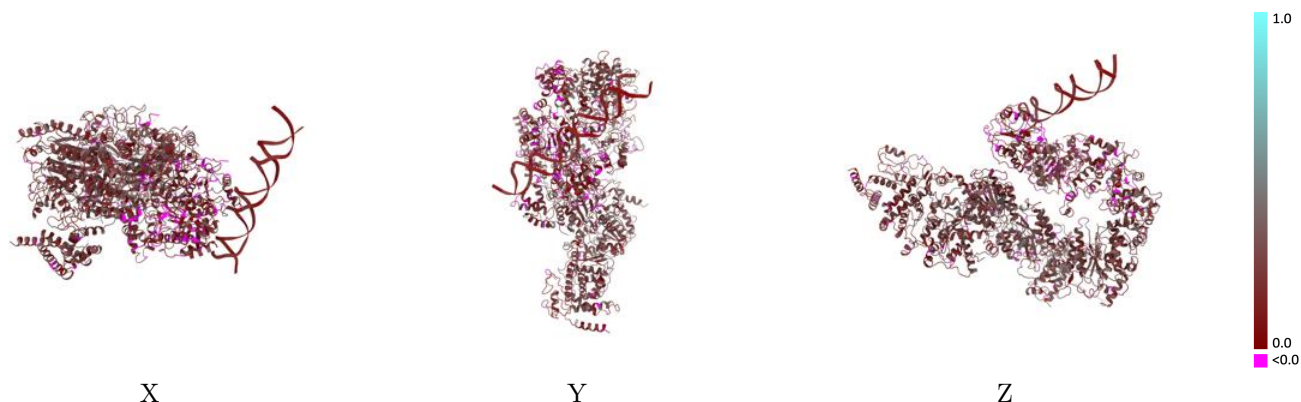
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 ⓘ
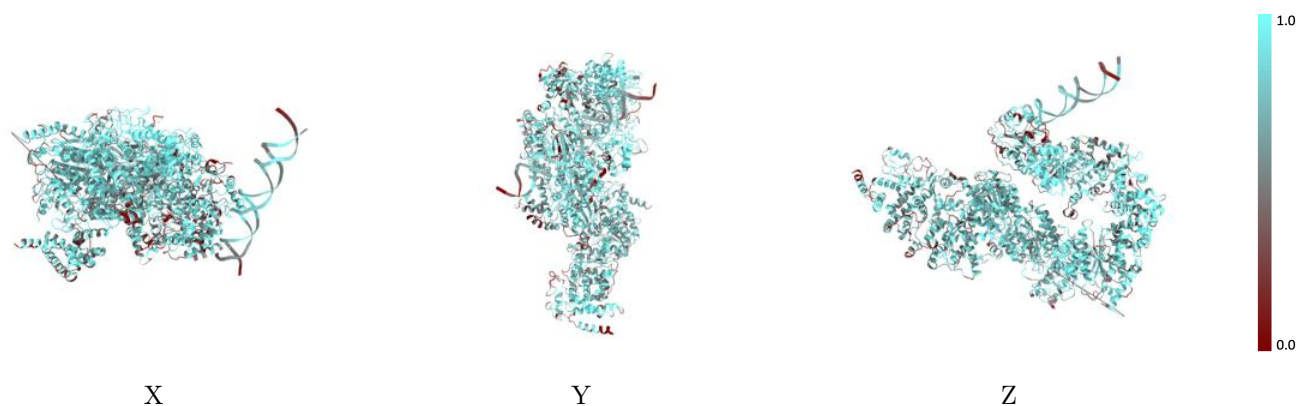
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.018).

9.4   Atom inclusion ⓘ
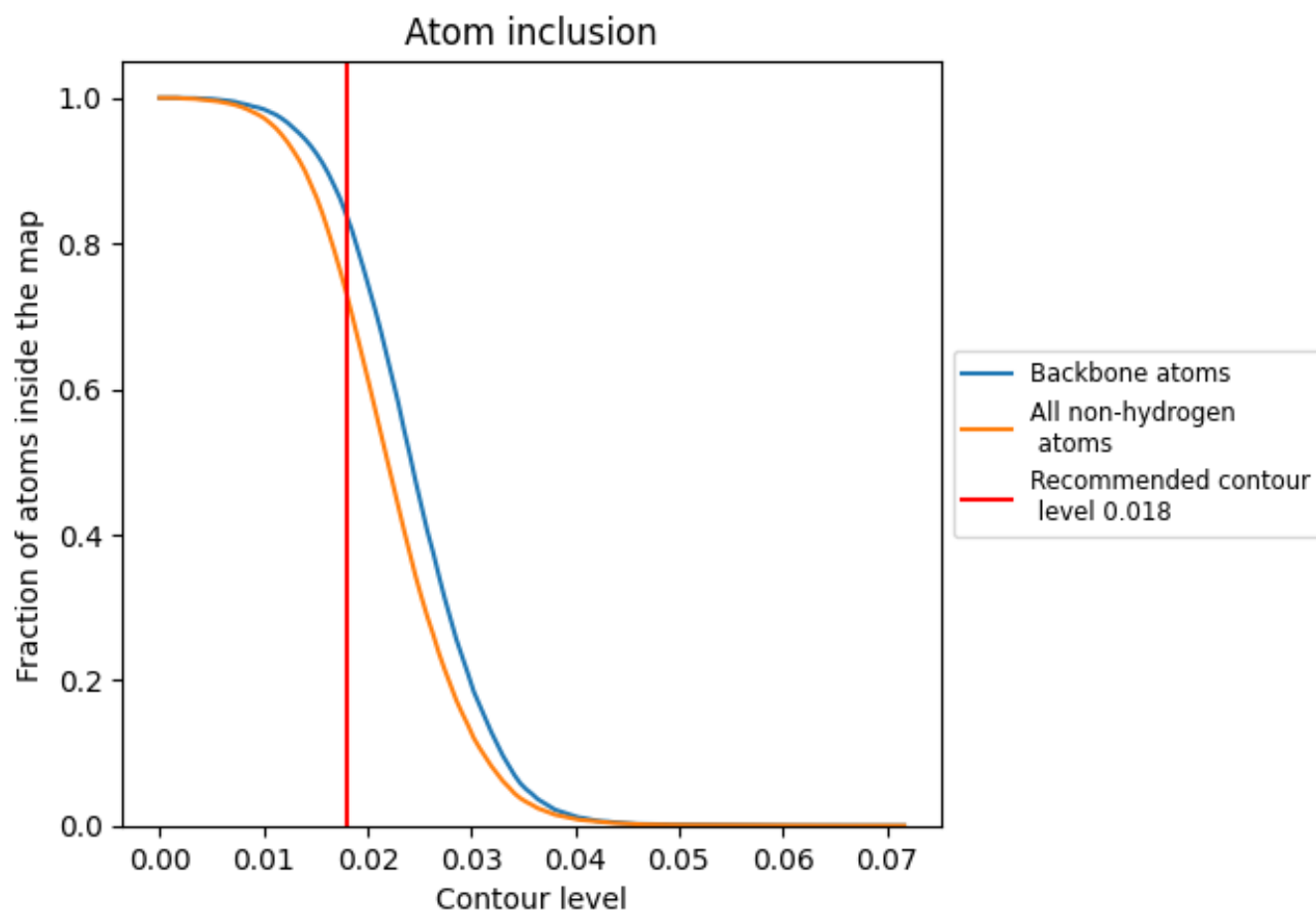
At the recommended contour level, 84% of all backbone atoms, 73% of all non-hydrogen atoms, are inside the map.

9.5　Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.018) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7303	0.2150
0	0.7489	0.2480
1	0.6626	0.2230
2	0.7397	0.1980
3	0.6569	0.2150
4	0.7357	0.2550
5	0.6951	0.1500
6	0.8229	0.2810
7	0.7284	0.1390
N	0.6554	0.1560
T	0.5875	0.1270

1.0

0.0

<0.0