Full wwPDB EM Validation Report ⓘ

Nov 29, 2025 – 12:23 PM EST

PDB ID	:	9OOO / pdb_00009ooo
EMDB ID	:	EMD-70667
Title	:	Human delta 2 receptor with R710W Cerebellar Ataxia mutation in the apo closed state
Authors	:	Wang, H.; Ahmed, F.; Khau, J.; Mondal, A.K.; Twomey, E.C.
Deposited on	:	2025-05-16
Resolution	:	3.68 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 ⓘ 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 ⓘ) were used in the production of this report:

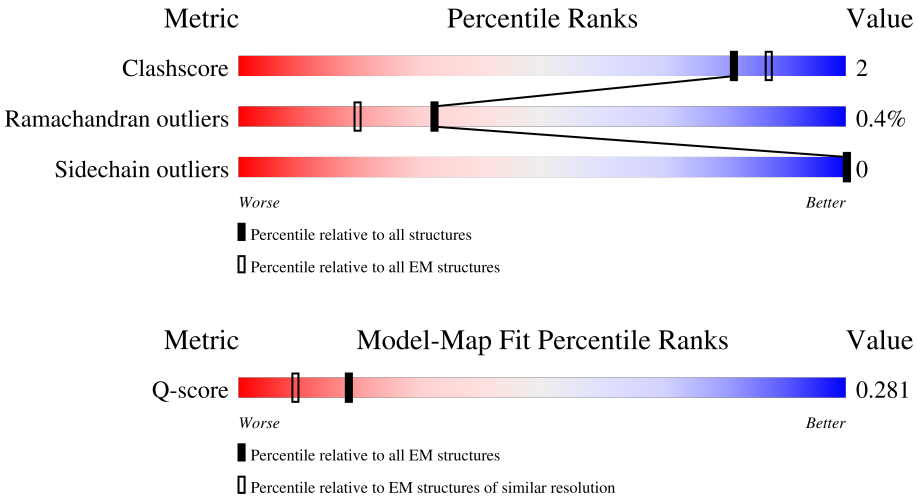
EMDB validation analysis	:	0.0.1.dev129
MolProbity	:	4-5-2 with Phenix2.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.46

1 Overall quality at a glance

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

The reported resolution of this entry is 3.68 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	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	11376 (3.18 - 4.18)

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

Mol	Chain	Length	Quality of chain
1	A	836	14% 95% .
1	B	836	23% 94% 6%
1	C	836	60% 91% 8%
1	D	836	88% 92% 8%

2 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 26512 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 Glutamate receptor ionotropic, delta-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	836	Total	C	N	O	S	0	0
			6628	4217	1130	1242	39		
1	B	836	Total	C	N	O	S	0	0
			6628	4217	1130	1242	39		
1	C	836	Total	C	N	O	S	0	0
			6628	4217	1130	1242	39		
1	D	836	Total	C	N	O	S	0	0
			6628	4217	1130	1242	39		

There are 4 discrepancies between the modelled and reference sequences:

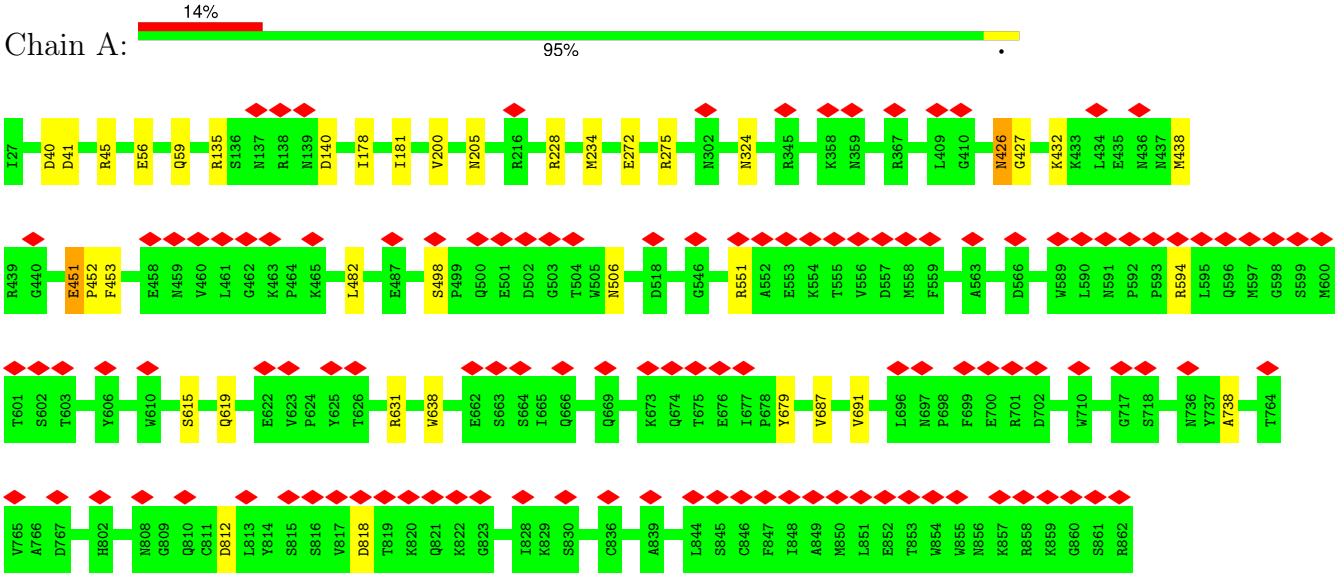
Chain	Residue	Modelled	Actual	Comment	Reference
A	710	TRP	ARG	engineered mutation	UNP O43424
B	710	TRP	ARG	engineered mutation	UNP O43424
C	710	TRP	ARG	engineered mutation	UNP O43424
D	710	TRP	ARG	engineered mutation	UNP O43424

3 Residue-property plots (i)

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.

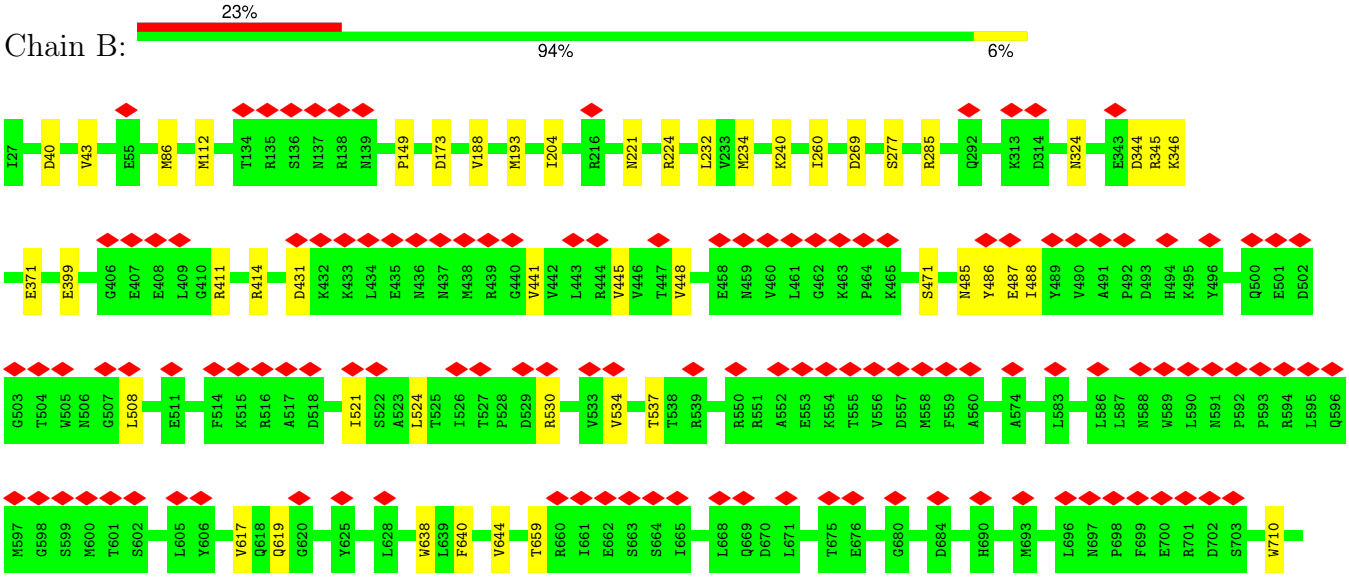
• Molecule 1: Glutamate receptor ionotropic, delta-2

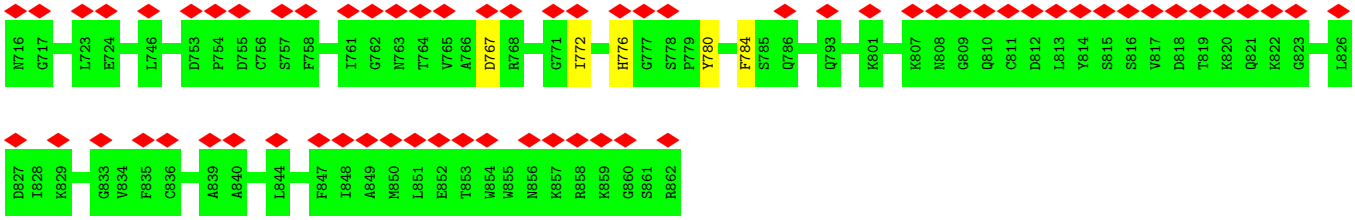
Chain A:



• Molecule 1: Glutamate receptor ionotropic, delta-2

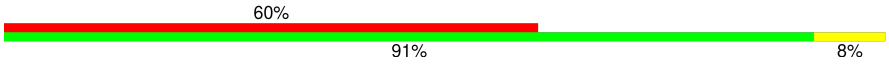
Chain B:

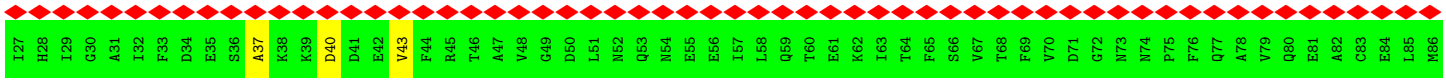


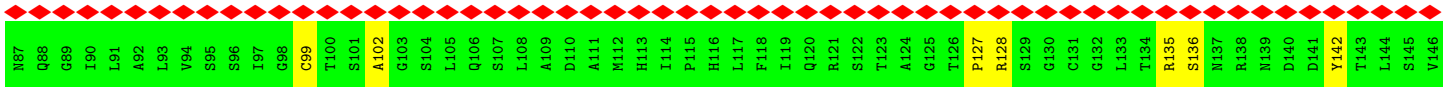


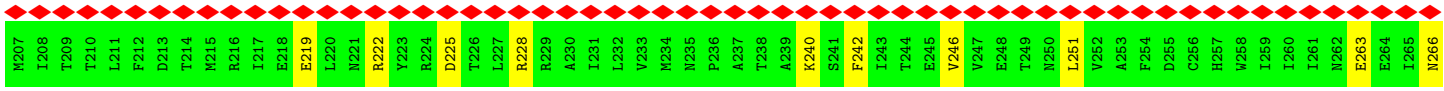
• Molecule 1: Glutamate receptor ionotropic, delta-2

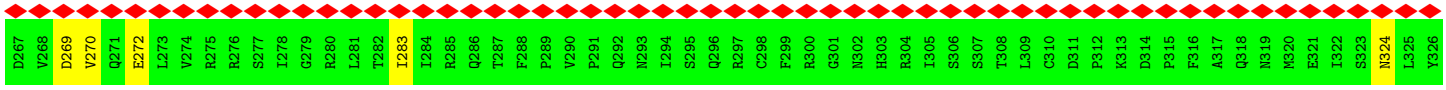
Chain C:

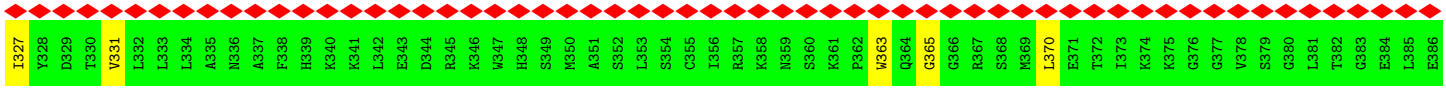


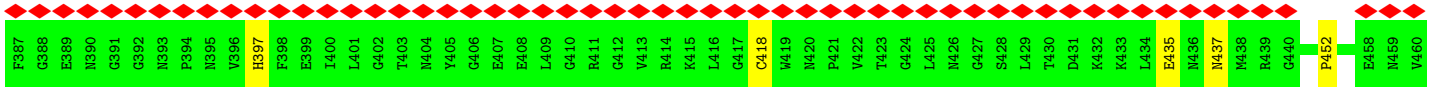


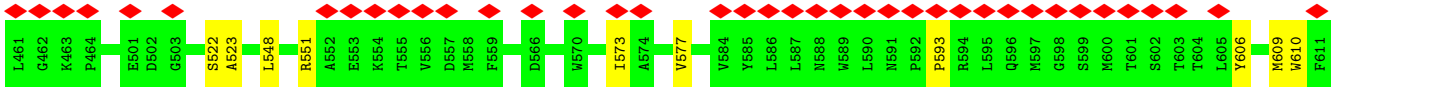


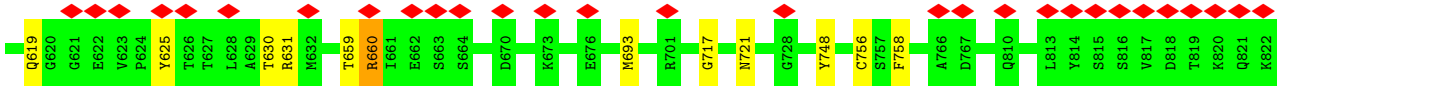


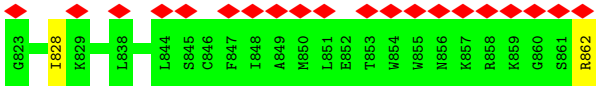






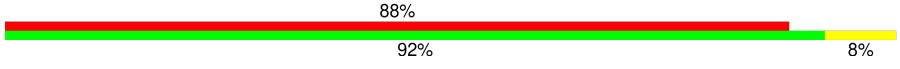


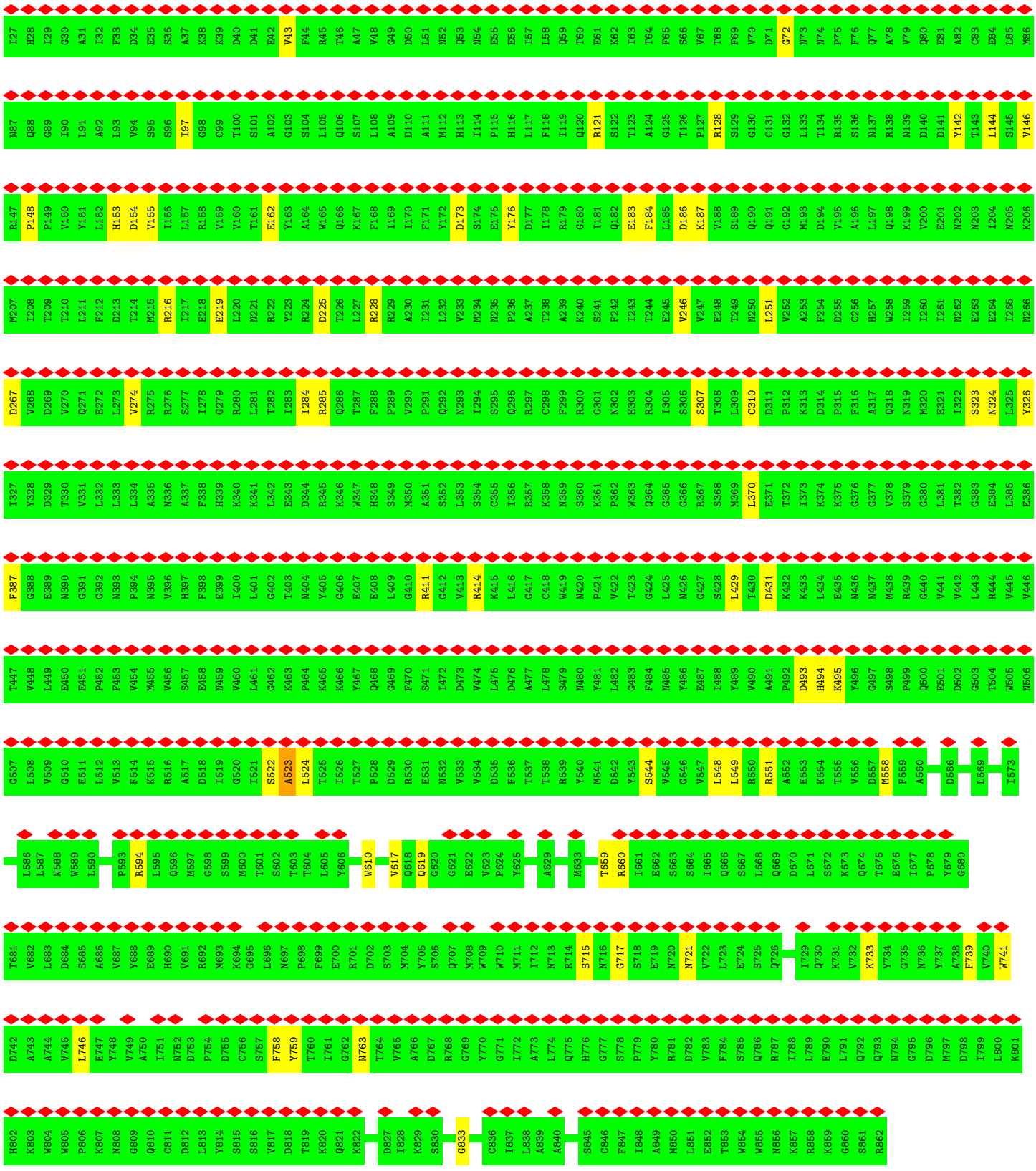




• Molecule 1: Glutamate receptor ionotropic, delta-2

Chain D:




I27 H28 I29 G30 A31 I32 F33 D34 E35 S36 A37 K38 K39 D40 D41 E42 V43 F44 R45 T46 A47 V48 G49 D50 L51 N52 Q53 N54 E55 E56 I57 L58 Q59 T60 E61 K62 I63 T64 F65 S66 V67 T68 F69 V70 D71 G72 N73 N74 P75 F76 Q77 A78 V79 Q80 E81 A82 C83 E84 L85 M86
N87 Q88 G89 I90 L91 A92 L93 V94 S95 S96 I97 G98 C99 T100 S101 A102 G103 S104 L105 Q106 S107 L108 A109 D110 A111 M112 H113 I114 P115 H116 L117 F118 I119 Q120 R121 S122 T123 A124 G125 T126 P127 R128 S129 G130 C131 G132 L133 T134 R135 S136 N137 R138 N139 D140 D141 Y142 T143 L144 S145 V146
R147 P148 P149 V150 Y151 L152 H153 D154 V155 I156 L157 R158 V159 V160 T161 E162 Y163 A164 W165 Q166 K167 F168 I169 I170 F171 Y172 D173 S174 E175 Y176 D177 I178 R179 G180 I181 Q182 E183 F184 L185 D186 K187 V188 S189 Q190 Q191 G192 M193 D194 V195 A196 L197 Q198 K199 V200 E201 N202 N203 I204 N205 K206
M207 I208 T209 T210 L211 F212 D213 T214 M215 R216 I217 E218 E219 L220 N221 R222 Y223 R224 D225 T226 L227 R228 R229 A230 I231 L232 V233 M234 N235 P236 A237 T238 A239 K240 S241 F242 I243 T244 E245 V246 V247 E248 T249 N250 L251 V252 A253 F254 D255 C256 H257 W258 I259 I260 I261 N262 E263 E264 I265 N266
D267 V268 D269 V270 Q271 E272 L273 V274 R275 R276 S277 I278 G279 R280 L281 T282 I283 I284 R285 Q286 T287 F288 P289 V290 P291 Q292 N293 I294 S295 Q296 R297 C298 F299 R300 G301 N302 H303 R304 I305 S306 S307 T308 L309 C310 D311 P312 K313 D314 P315 F316 A317 Q318 N319 M320 E321 I322 S323 N324 L325 Y326
I327 Y328 D329 T330 V331 L332 L333 L334 A335 N336 A337 F338 H339 K340 K341 L342 E343 D344 R345 K346 W347 H348 S349 M350 A351 S352 L353 S354 C355 I356 R357 K358 N359 S360 K361 P362 W363 Q364 G365 G366 R367 S368 M369 L370 E371 T372 I373 K374 K375 G376 G377 V378 S379 G380 L381 T382 G383 E384 L385 E386
F387 G388 E389 N390 G391 G392 N393 P394 N395 V396 H397 P398 E399 I400 L401 G402 T403 N404 Y405 G406 E407 E408 L409 G410 R411 G412 V413 R414 K415 L416 G417 C418 W419 N420 P421 V422 T423 G424 L425 N426 G427 S428 L429 T430 D431 K432 K433 L434 E435 N436 N437 M438 R439 G440 V441 V442 L443 R444 V445 V446
T447 V448 L449 E450 E451 P452 F453 V454 M455 V456 S457 E458 N459 V460 L461 G462 K463 P464 K465 K466 Y467 Q468 G469 F470 S471 I472 D473 V474 L475 D476 A477 L478 S479 N480 Y481 L482 G483 F484 N485 Y486 E487 I488 Y489 V490 A491 P492 D493 H494 K495 Y496 G497 S498 P499 Q500 E501 D502 G503 T504 W505 N506
G507 L508 V509 G510 E511 L512 V513 F514 K515 R516 A517 D518 I519 G520 I521 S522 A523 L524 T525 I526 T527 P528 D529 R530 E531 N532 V533 V534 D535 F536 T537 T538 R539 Y540 M541 D542 Y543 S544 V545 G546 V547 L548 L549 R550 R551 A552 E553 K554 T555 V556 D557 M558 F559 A560 D566 L569 I573
L586 L587 N588 W589 L590 P593 R594 L595 Q596 M597 G598 S599 M600 T601 S602 T603 T604 L605 Y606 W610 V617 Q618 G619 G620 G621 E622 V623 P624 Y625 A629 M633 T659 R660 I661 E662 S663 S664 I665 Q666 S667 L668 Q669 D670 L671 S672 K673 Q674 T675 E676 I677 P678 Y679 G680
T681 V682 L683 D684 S685 A686 V687 Y688 E689 H690 V691 R692 M693 K694 G695 L696 N697 P698 F699 E700 R701 D702 S703 M704 Y705 S706 Q707 M708 W709 W710 M711 I712 N713 R714 S715 N716 G717 S718 E719 N720 N721 V722 L723 E724 S725 Q726 I729 Q730 K731 V732 K733 Y734 G735 N736 Y737 A738 F739 V740 W741
D742 A743 A744 V745 L746 E747 Y748 V749 A750 I751 N752 D753 P754 D755 C756 S757 F758 Y759 T760 I761 G762 N763 T764 V765 A766 D767 R768 G769 Y770 G771 I772 A773 L774 Q775 H776 G777 S778 P779 Y780 R781 D782 V783 F784 S785 Q786 R787 I788 L789 E790 L791 Q792 Q793 N794 G795 D796 M797 D798 I799 L800 K801
H802 K803 W804 W805 P806 K807 N808 G809 Q810 C811 D812 L813 Y814 S815 S816 V817 D818 T819 K820 Q821 K822 D827 I828 K829 S830 G833 C836 I837 L838 A839 A840 S845 C846 F847 I848 A849 M850 L851 E852 T853 W854 W855 N856 K857 R858 K859 G860 S861 R862

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	153060	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	45.0	Depositor
Minimum defocus (nm)	900	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	2.449	Depositor
Minimum map value	-1.581	Depositor
Average map value	-0.001	Depositor
Map value standard deviation	0.034	Depositor
Recommended contour level	0.25	Depositor
Map size (Å)	407.04, 407.04, 407.04	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.59, 1.59, 1.59	Depositor

5 Model quality

5.1 Standard geometry

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\#\|Z\| > 5$	RMSZ	$\#\|Z\| > 5$
1	A	0.13	0/6770	0.43	1/9180 (0.0%)
1	B	0.14	0/6770	0.43	0/9180
1	C	0.13	0/6770	0.41	1/9180 (0.0%)
1	D	0.13	0/6770	0.40	0/9180
All	All	0.13	0/27080	0.42	2/36720 (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
1	A	0	1

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	451	GLU	C-N-CD	-6.93	96.58	125.00
1	C	660	ARG	N-CA-C	5.18	121.84	110.80

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	228	ARG	Sidechain

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen

atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	6628	0	6549	23	0
1	B	6628	0	6549	33	0
1	C	6628	0	6549	42	0
1	D	6628	0	6549	37	0
All	All	26512	0	26196	126	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 2.

All (126) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:188:VAL:HG13	1:B:193:MET:HE2	1.59	0.84
1:A:56:GLU:O	1:A:59:GLN:NE2	2.16	0.78
1:C:246:VAL:HG13	1:C:251:LEU:HB2	1.68	0.76
1:C:147:ARG:NH2	1:C:263:GLU:OE1	2.23	0.71
1:C:37:ALA:HB1	1:C:40:ASP:HB2	1.73	0.71
1:B:40:ASP:OD1	1:B:324:ASN:ND2	2.26	0.69
1:D:155:VAL:HG11	1:D:284:ILE:HG21	1.77	0.67
1:B:537:THR:OG1	1:B:772:ILE:N	2.27	0.65
1:A:40:ASP:OD1	1:A:324:ASN:ND2	2.31	0.63
1:A:615:SER:HB2	1:A:638:TRP:HE1	1.63	0.62
1:C:178:ILE:O	1:C:181:ILE:HG12	2.02	0.60
1:C:43:VAL:HG21	1:C:324:ASN:HB3	1.82	0.60
1:C:225:ASP:OD1	1:C:228:ARG:NH1	2.35	0.59
1:D:128:ARG:NH2	1:D:148:PRO:O	2.29	0.59
1:D:225:ASP:OD1	1:D:228:ARG:NH1	2.32	0.59
1:C:266:ASN:ND2	1:C:269:ASP:OD2	2.36	0.58
1:A:812:ASP:HB2	1:B:710:TRP:CZ2	2.39	0.58
1:D:717:GLY:O	1:D:721:ASN:ND2	2.35	0.58
1:A:631:ARG:HH21	1:C:610:TRP:CD1	2.22	0.57
1:D:267:ASP:OD1	1:D:285:ARG:NH1	2.23	0.57
1:D:274:VAL:O	1:D:411:ARG:NH1	2.38	0.57
1:B:285:ARG:NE	1:B:399:GLU:OE2	2.38	0.56
1:A:272:GLU:OE2	1:A:275:ARG:NH1	2.38	0.56
1:B:521:ILE:HA	1:B:772:ILE:HG23	1.87	0.55
1:B:344:ASP:OD2	1:B:346:LYS:NZ	2.34	0.55
1:C:659:THR:O	1:C:660:ARG:HG2	2.07	0.55
1:C:128:ARG:NH2	1:C:148:PRO:O	2.33	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:200:VAL:HG21	1:A:234:MET:HE1	1.88	0.55
1:C:270:VAL:HG13	1:C:283:ILE:HD12	1.89	0.54
1:C:625:TYR:HE2	1:C:630:THR:HB	1.72	0.54
1:B:43:VAL:HG21	1:B:324:ASN:HB3	1.89	0.53
1:D:173:ASP:OD1	1:D:176:TYR:N	2.42	0.53
1:D:162:GLU:HG2	1:D:429:LEU:HB2	1.90	0.52
1:B:537:THR:N	1:B:772:ILE:O	2.38	0.52
1:B:780:TYR:HB3	1:B:784:PHE:CE2	2.45	0.52
1:B:221:ASN:OD1	1:B:224:ARG:NH1	2.42	0.52
1:A:205:ASN:ND2	1:C:693:MET:SD	2.81	0.52
1:B:277:SER:O	1:B:411:ARG:NH2	2.43	0.52
1:A:451:GLU:C	1:A:453:PHE:H	2.19	0.51
1:B:232:LEU:HB2	1:B:260:ILE:HG13	1.93	0.50
1:B:445:VAL:N	1:B:487:GLU:O	2.45	0.50
1:B:173:ASP:N	1:B:173:ASP:OD1	2.43	0.49
1:B:471:SER:HB3	1:B:772:ILE:HD11	1.95	0.49
1:C:240:LYS:NZ	1:C:272:GLU:OE1	2.44	0.49
1:C:625:TYR:CE2	1:C:630:THR:HB	2.48	0.49
1:D:216:ARG:NH1	1:D:219:GLU:OE2	2.39	0.48
1:B:524:LEU:HD23	1:B:530:ARG:HD3	1.95	0.48
1:B:232:LEU:HD22	1:B:234:MET:HE3	1.95	0.48
1:D:153:HIS:HB2	1:D:184:PHE:HB2	1.95	0.48
1:D:549:LEU:HD22	1:D:759:TYR:OH	2.14	0.48
1:A:438:MET:HE1	1:A:482:LEU:HD13	1.96	0.48
1:B:640:PHE:O	1:B:644:VAL:HG23	2.14	0.48
1:A:551:ARG:NH1	1:A:818:ASP:OD1	2.47	0.47
1:B:617:VAL:HG23	1:B:619:GLN:HG2	1.96	0.47
1:D:121:ARG:NH1	1:D:323:SER:OG	2.47	0.47
1:B:445:VAL:HB	1:B:488:ILE:HG12	1.95	0.47
1:C:154:ASP:OD1	1:C:187:LYS:NZ	2.34	0.47
1:B:371:GLU:O	1:B:371:GLU:HG2	2.15	0.47
1:A:426:ASN:CG	1:A:427:GLY:H	2.23	0.47
1:A:451:GLU:O	1:A:453:PHE:N	2.47	0.47
1:B:414:ARG:NH2	1:B:431:ASP:OD2	2.43	0.47
1:D:154:ASP:OD1	1:D:187:LYS:NZ	2.40	0.46
1:C:142:TYR:CD2	1:C:370:LEU:HD22	2.51	0.46
1:A:679:TYR:HB3	1:A:738:ALA:HB3	1.98	0.45
1:B:445:VAL:HB	1:B:488:ILE:HA	1.99	0.45
1:B:204:ILE:H	1:B:204:ILE:HD12	1.80	0.45
1:B:534:VAL:HA	1:B:776:HIS:HB2	1.96	0.45
1:C:573:ILE:O	1:C:577:VAL:HG23	2.16	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:240:LYS:NZ	1:B:269:ASP:OD1	2.37	0.45
1:D:522:SER:OG	1:D:523:ALA:N	2.50	0.45
1:D:659:THR:HG22	1:D:660:ARG:N	2.32	0.45
1:D:493:ASP:O	1:D:495:LYS:N	2.48	0.45
1:C:99:CYS:HA	1:C:102:ALA:HB3	1.99	0.45
1:C:219:GLU:OE2	1:C:222:ARG:NH2	2.50	0.45
1:C:435:GLU:OE1	1:C:437:ASN:ND2	2.49	0.45
1:C:828:ILE:HD12	1:C:828:ILE:H	1.81	0.45
1:D:741:TRP:HB3	1:D:746:LEU:HD21	1.99	0.44
1:D:146:VAL:HG12	1:D:326:TYR:HD1	1.83	0.44
1:B:448:VAL:HG23	1:B:508:LEU:HD13	2.00	0.44
1:C:551:ARG:NH2	1:C:756:CYS:SG	2.91	0.44
1:B:445:VAL:HG21	1:B:486:TYR:HB2	1.99	0.44
1:D:522:SER:C	1:D:524:LEU:H	2.26	0.43
1:B:441:VAL:O	1:B:485:ASN:N	2.48	0.43
1:A:619:GLN:HG3	1:B:638:TRP:CG	2.54	0.43
1:C:606:TYR:HA	1:C:609:MET:HG3	2.01	0.43
1:A:432:LYS:HB3	1:A:432:LYS:HE3	1.80	0.43
1:D:548:LEU:HB2	1:D:746:LEU:HD13	2.01	0.43
1:D:739:PHE:CE2	1:D:741:TRP:HB2	2.52	0.43
1:D:72:GLY:HA2	1:D:97:ILE:HD11	2.00	0.43
1:D:544:SER:OG	1:D:763:ASN:O	2.35	0.43
1:A:498:SER:N	1:A:506:ASN:OD1	2.51	0.43
1:A:41:ASP:CG	1:A:45:ARG:HE	2.27	0.43
1:C:631:ARG:HB3	1:D:610:TRP:CH2	2.54	0.42
1:D:144:LEU:HB3	1:D:387:PHE:CE1	2.54	0.42
1:D:558:MET:HE3	1:D:833:GLY:HA2	2.00	0.42
1:D:142:TYR:CD2	1:D:370:LEU:HD22	2.53	0.42
1:D:617:VAL:C	1:D:619:GLN:H	2.27	0.42
1:C:717:GLY:O	1:C:721:ASN:ND2	2.40	0.42
1:D:183:GLU:HG2	1:D:187:LYS:HE3	2.02	0.42
1:A:638:TRP:CD2	1:C:619:GLN:HG3	2.55	0.42
1:C:170:ILE:N	1:C:196:ALA:O	2.45	0.42
1:D:548:LEU:C	1:D:549:LEU:HD12	2.44	0.42
1:C:327:ILE:O	1:C:331:VAL:HG23	2.20	0.42
1:C:157:LEU:HD22	1:C:187:LYS:HD3	2.02	0.42
1:C:452:PRO:HB3	1:C:748:TYR:CZ	2.55	0.42
1:D:493:ASP:C	1:D:495:LYS:H	2.27	0.42
1:A:135:ARG:NH2	1:A:140:ASP:O	2.53	0.41
1:C:397:HIS:HE1	1:C:418:CYS:HB3	1.85	0.41
1:A:594:ARG:NH2	1:C:862:ARG:O	2.46	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:631:ARG:HH21	1:C:610:TRP:CG	2.38	0.41
1:C:363:TRP:CH2	1:C:365:GLY:HA3	2.55	0.41
1:A:687:VAL:O	1:A:691:VAL:HG23	2.21	0.41
1:D:43:VAL:HG21	1:D:324:ASN:CG	2.46	0.41
1:B:86:MET:HE1	1:B:112:MET:HG3	2.03	0.41
1:D:246:VAL:HG22	1:D:251:LEU:HD12	2.03	0.41
1:C:127:PRO:HB2	1:C:176:TYR:CE1	2.56	0.41
1:C:135:ARG:NH1	1:C:136:SER:O	2.51	0.41
1:C:199:LYS:N	1:D:186:ASP:OD1	2.54	0.41
1:C:548:LEU:HD11	1:C:758:PHE:HB3	2.03	0.41
1:D:733:LYS:HB2	1:D:758:PHE:CZ	2.55	0.41
1:C:188:VAL:O	1:C:192:GLY:N	2.52	0.40
1:B:445:VAL:CG2	1:B:486:TYR:HB2	2.51	0.40
1:C:242:PHE:O	1:C:246:VAL:HG23	2.22	0.40
1:C:522:SER:OG	1:C:523:ALA:N	2.54	0.40
1:D:307:SER:HA	1:D:310:CYS:SG	2.61	0.40
1:D:414:ARG:NH2	1:D:431:ASP:OD1	2.47	0.40

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	A	834/836 (100%)	782 (94%)	48 (6%)	4 (0%)	25	57
1	B	834/836 (100%)	762 (91%)	68 (8%)	4 (0%)	25	57
1	C	834/836 (100%)	791 (95%)	42 (5%)	1 (0%)	48	78
1	D	834/836 (100%)	791 (95%)	38 (5%)	5 (1%)	22	54
All	All	3336/3344 (100%)	3126 (94%)	196 (6%)	14 (0%)	32	61

All (14) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	452	PRO
1	A	178	ILE
1	A	181	ILE
1	D	551	ARG
1	D	494	HIS
1	D	715	SER
1	B	149	PRO
1	B	659	THR
1	D	523	ALA
1	A	426	ASN
1	B	345	ARG
1	B	767	ASP
1	C	593	PRO
1	D	594	ARG

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	A	726/726 (100%)	726 (100%)	0	100	100
1	B	726/726 (100%)	726 (100%)	0	100	100
1	C	726/726 (100%)	726 (100%)	0	100	100
1	D	726/726 (100%)	726 (100%)	0	100	100
All	All	2904/2904 (100%)	2904 (100%)	0	100	100

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

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (21) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	293	ASN
1	A	296	GLN
1	A	324	ASN
1	A	336	ASN
1	A	348	HIS

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Mol	Chain	Res	Type
1	A	437	ASN
1	B	205	ASN
1	B	404	ASN
1	B	436	ASN
1	B	459	ASN
1	B	588	ASN
1	B	713	ASN
1	B	776	HIS
1	C	73	ASN
1	C	74	ASN
1	C	77	GLN
1	C	182	GLN
1	C	293	ASN
1	C	296	GLN
1	C	690	HIS
1	D	303	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 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 (i)

There are no chain breaks in this entry.

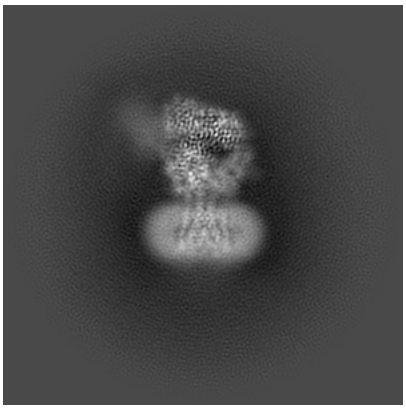
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-70667. These allow visual inspection of the internal detail of the map and identification of artifacts.

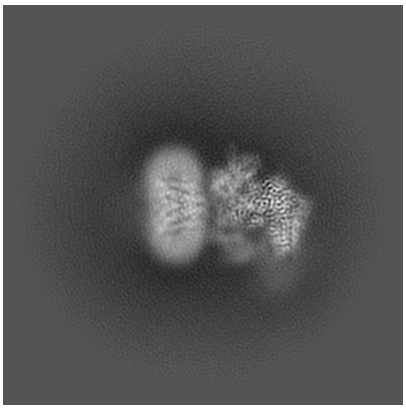
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

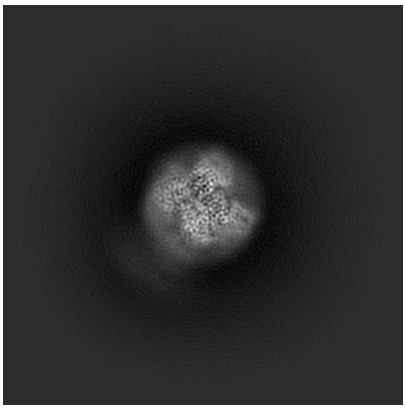
6.1.1 Primary map



X

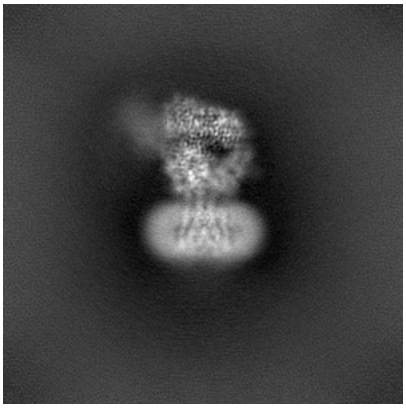


Y

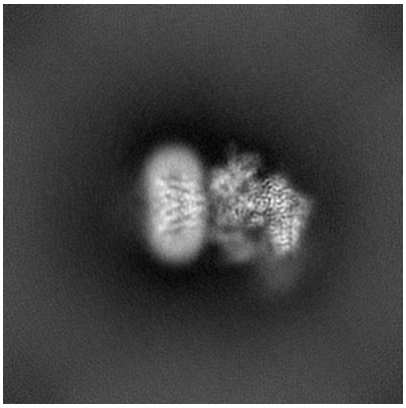


Z

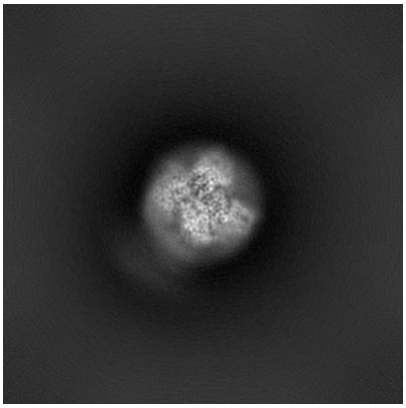
6.1.2 Raw map



X



Y

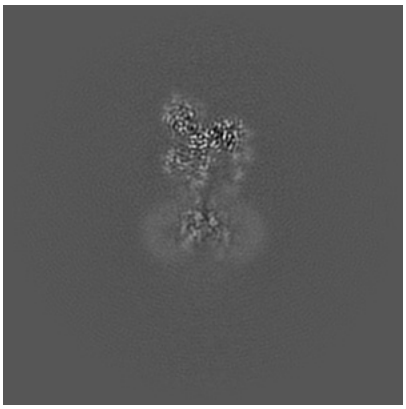


Z

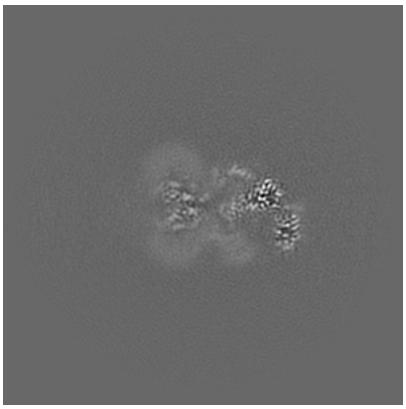
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

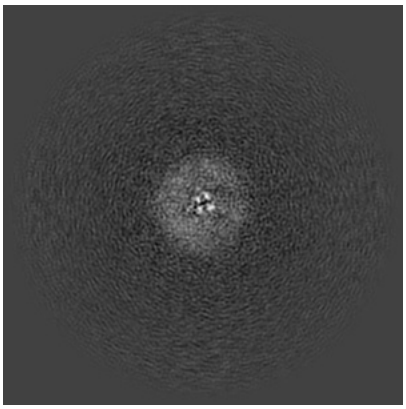
6.2.1 Primary map



X Index: 128

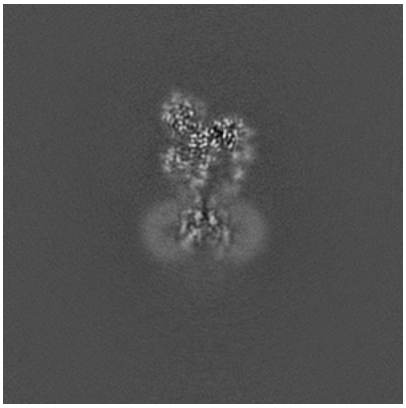


Y Index: 128

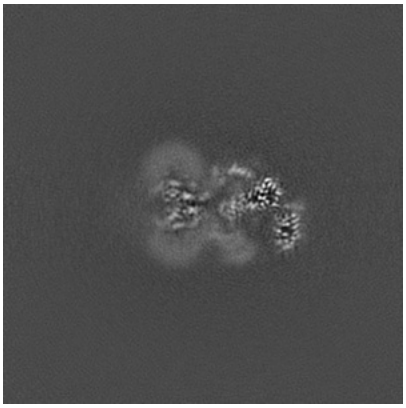


Z Index: 128

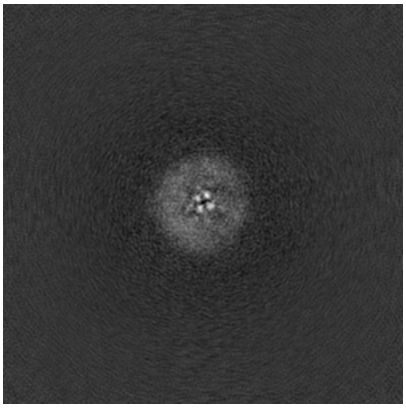
6.2.2 Raw map



X Index: 128



Y Index: 128

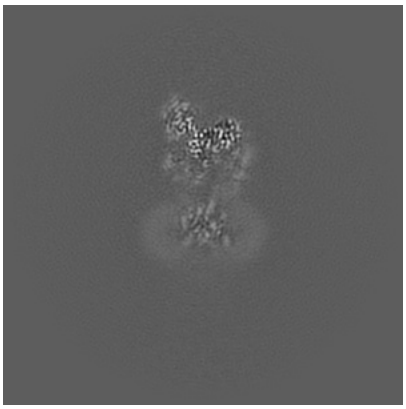


Z Index: 128

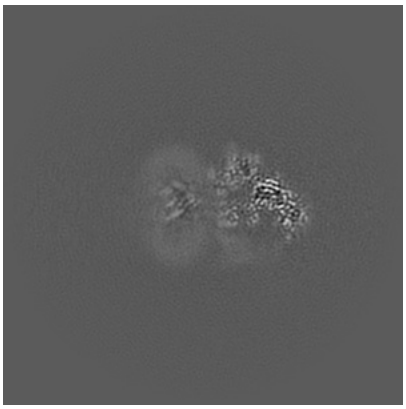
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

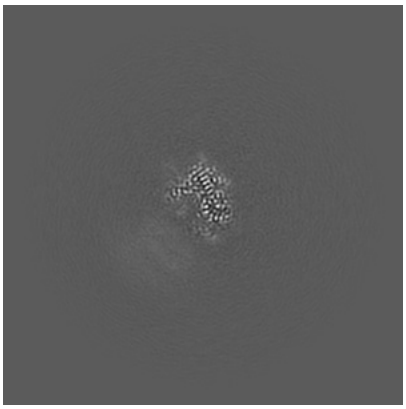
6.3.1 Primary map



X Index: 130

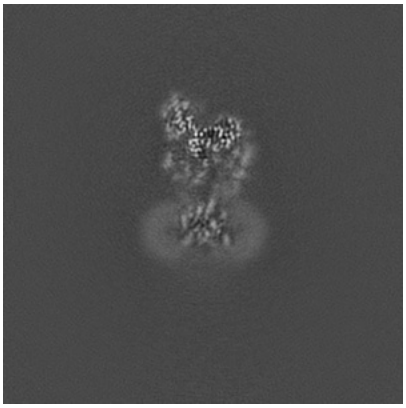


Y Index: 120

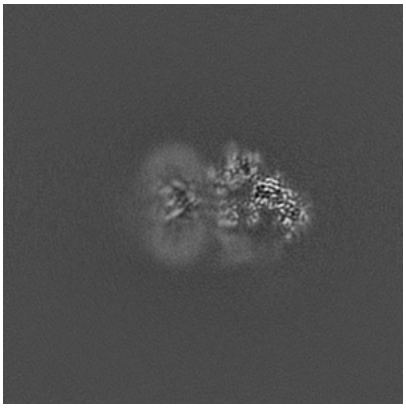


Z Index: 172

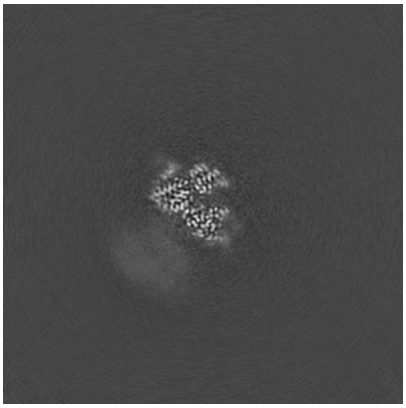
6.3.2 Raw map



X Index: 130



Y Index: 120

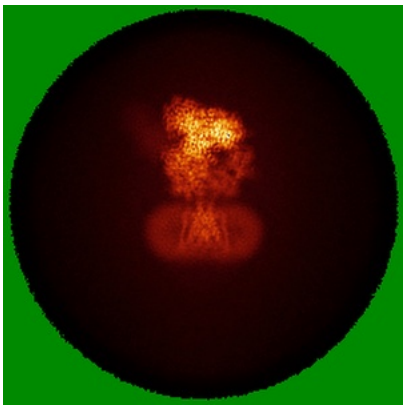


Z Index: 179

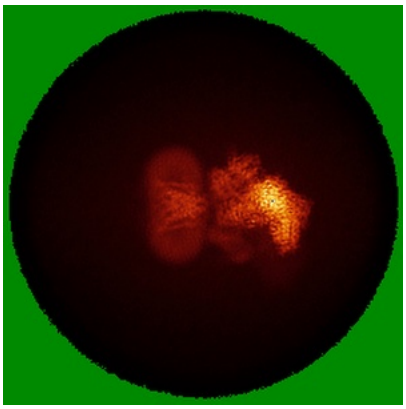
The images above show the largest variance slices of the map in three orthogonal directions.

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

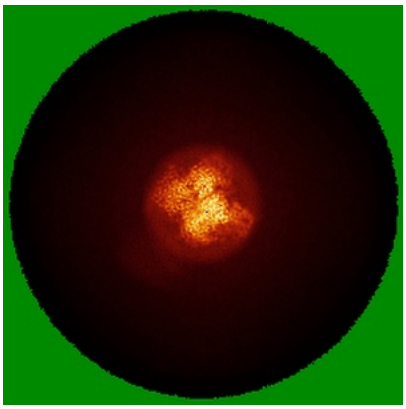
6.4.1 Primary map



X

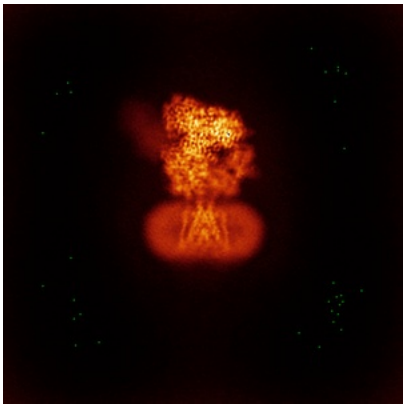


Y

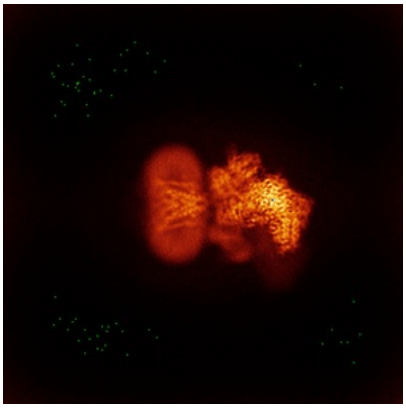


Z

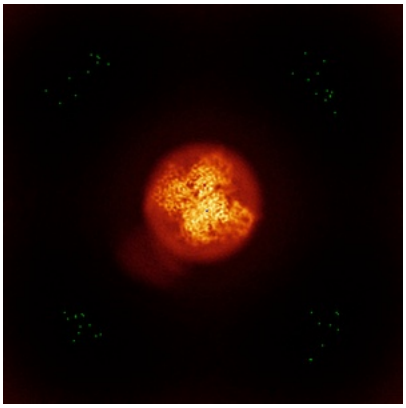
6.4.2 Raw map



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

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.25. 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.

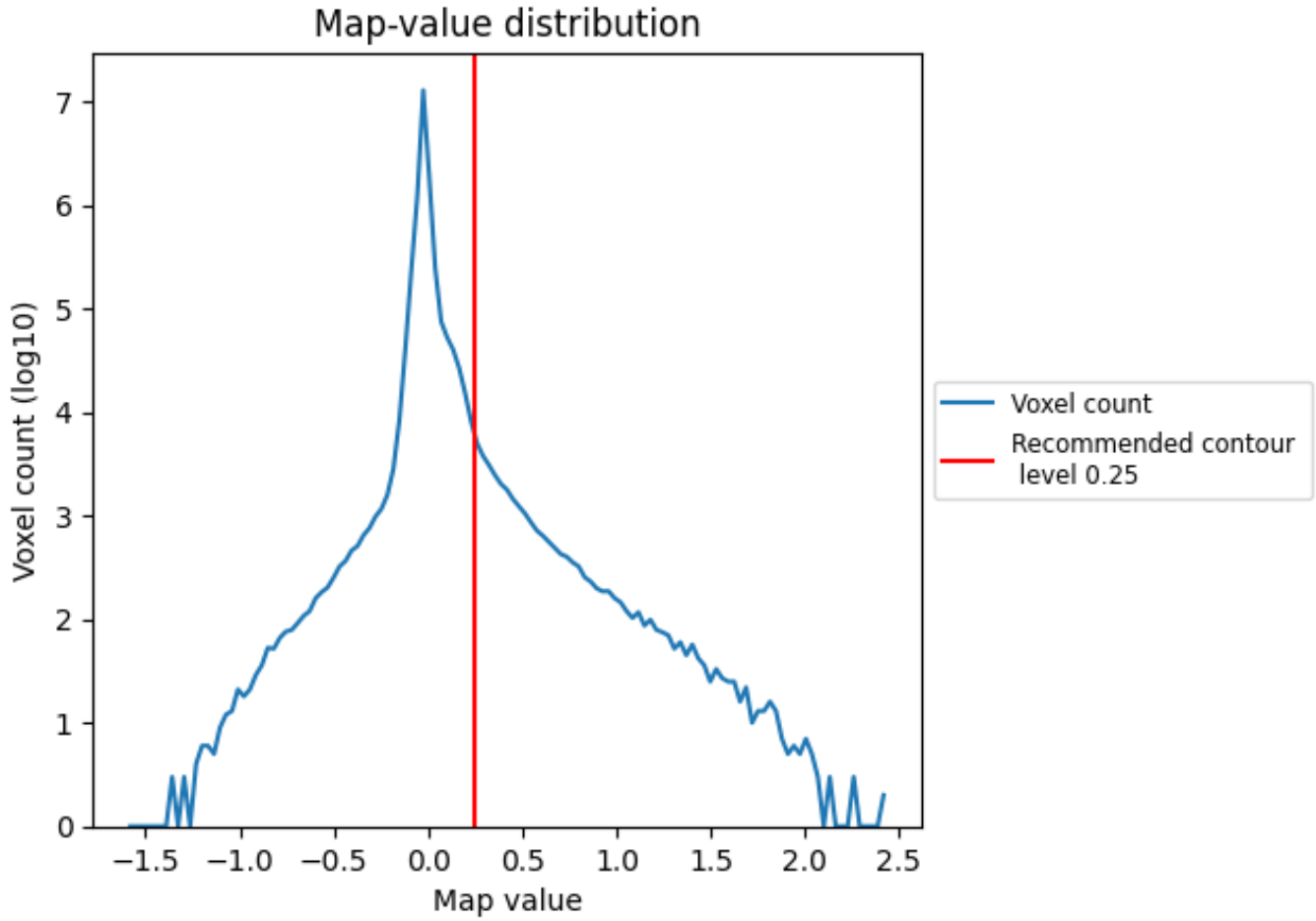
6.6 Mask visualisation (i)

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

7 Map analysis

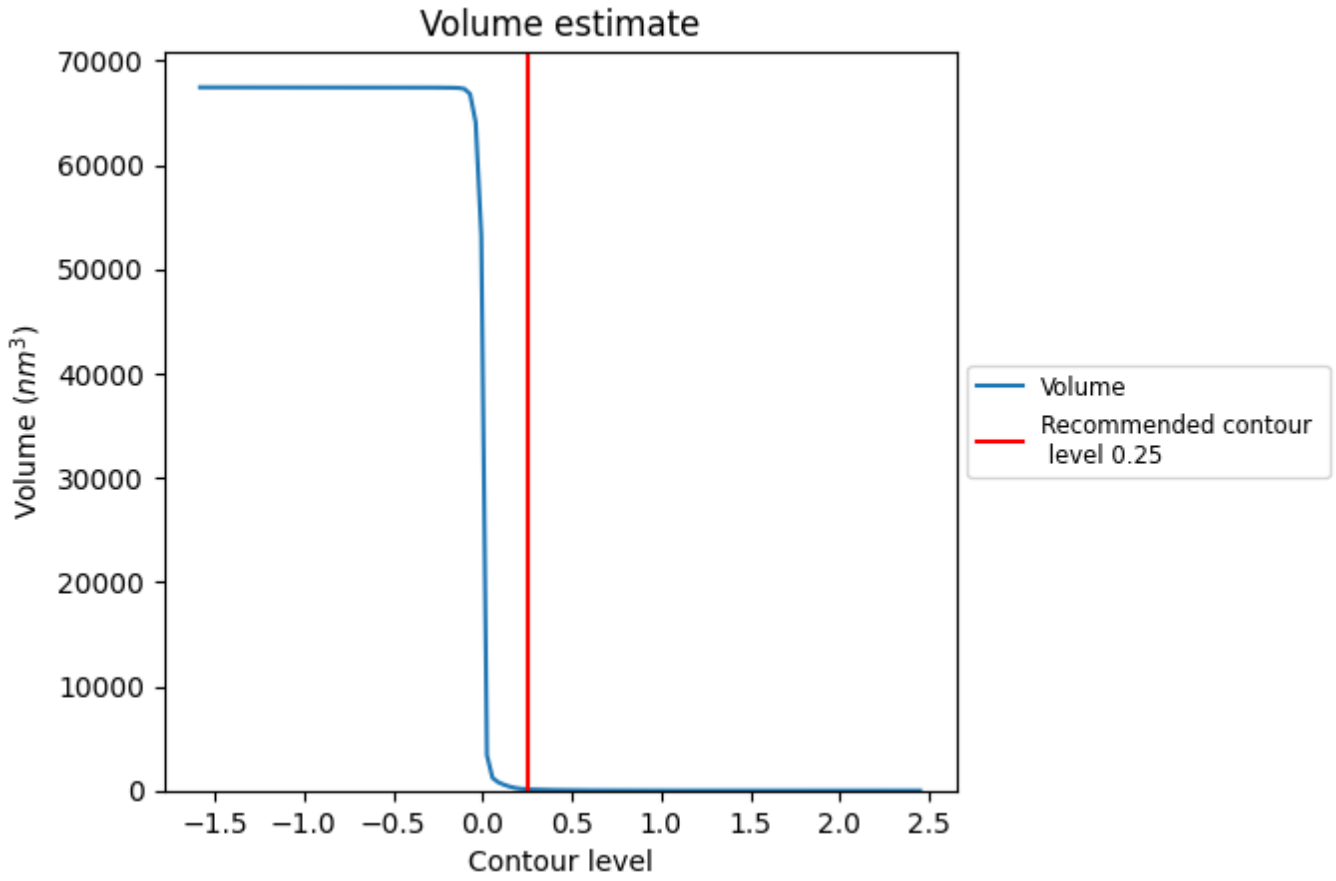
This section contains the results of statistical analysis of the map.

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.

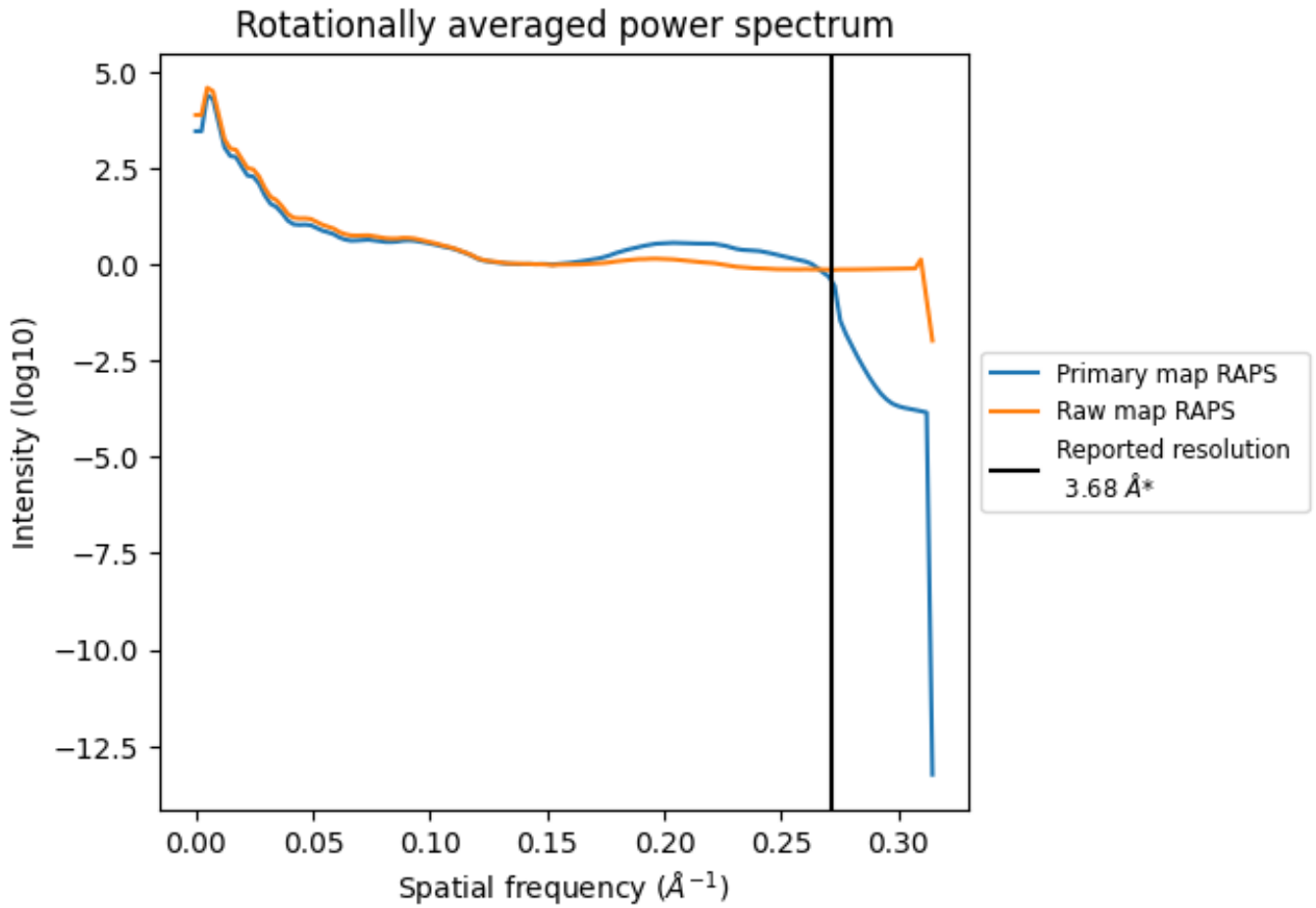
7.2 Volume estimate



The volume at the recommended contour level is 127 nm^3; this corresponds to an approximate mass of 115 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)

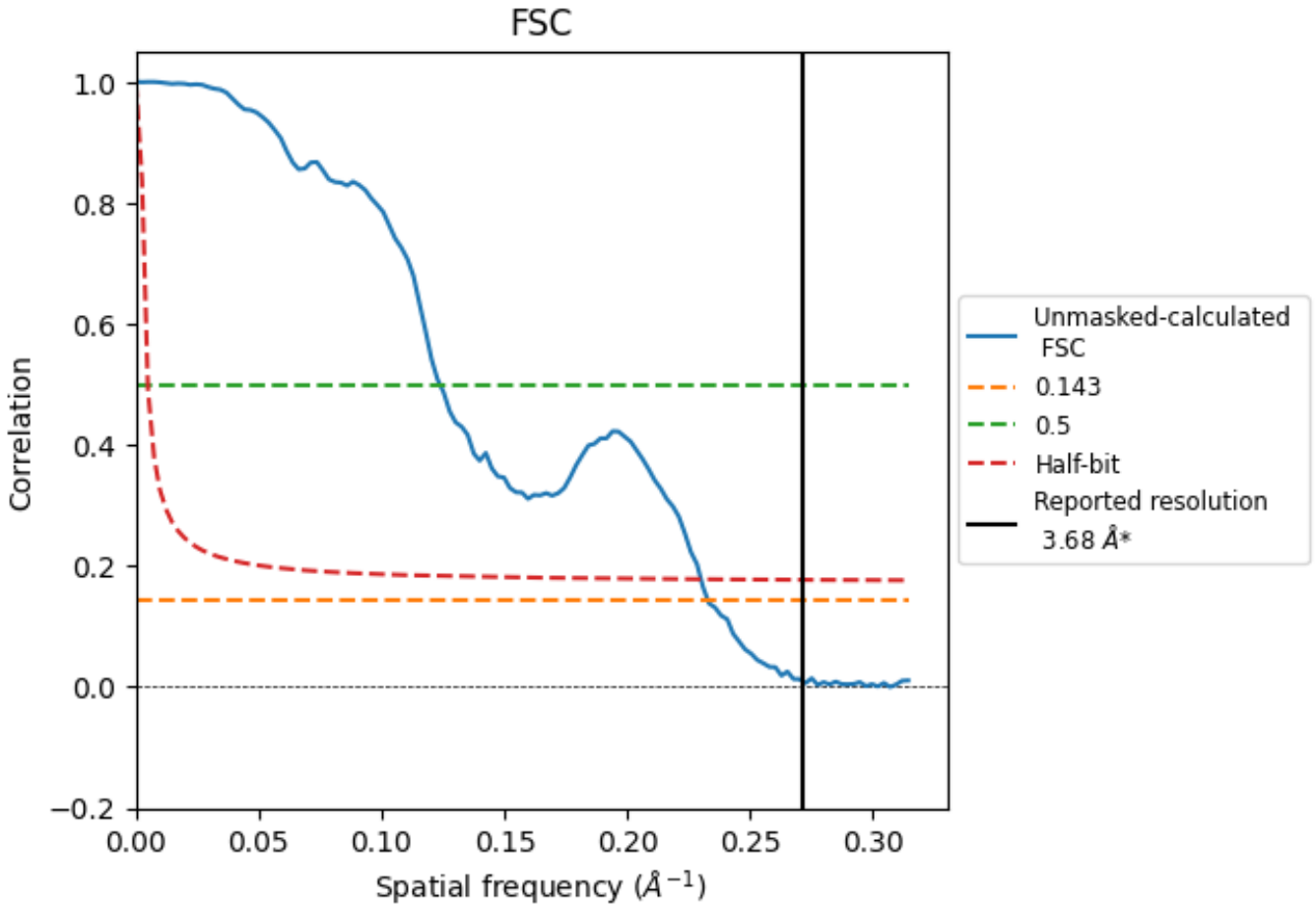


*Reported resolution corresponds to spatial frequency of 0.272 $Å^{-1}$

8 Fourier-Shell correlation

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

8.1 FSC



*Reported resolution corresponds to spatial frequency of 0.272 Å^{-1}

8.2 Resolution estimates (i)

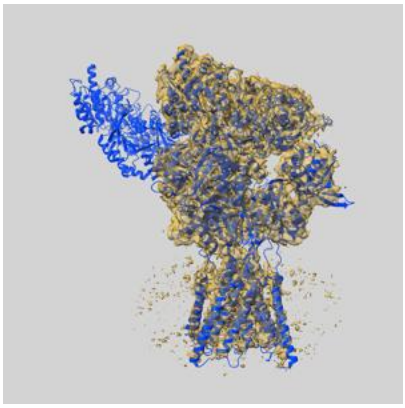
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.68	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.29	8.08	4.35

*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 4.29 differs from the reported value 3.68 by more than 10 %

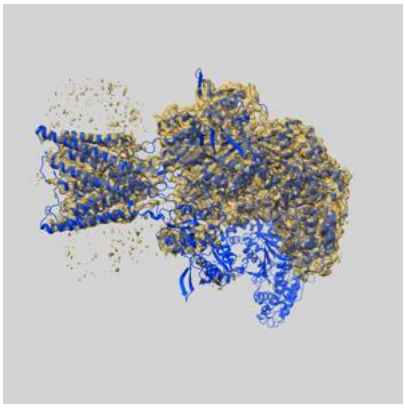
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-70667 and PDB model 9OOO. Per-residue inclusion information can be found in section 3 on page 4.

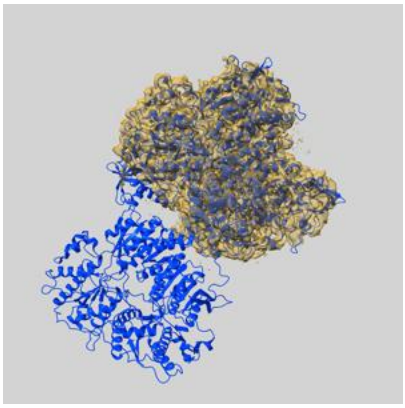
9.1 Map-model overlay



X



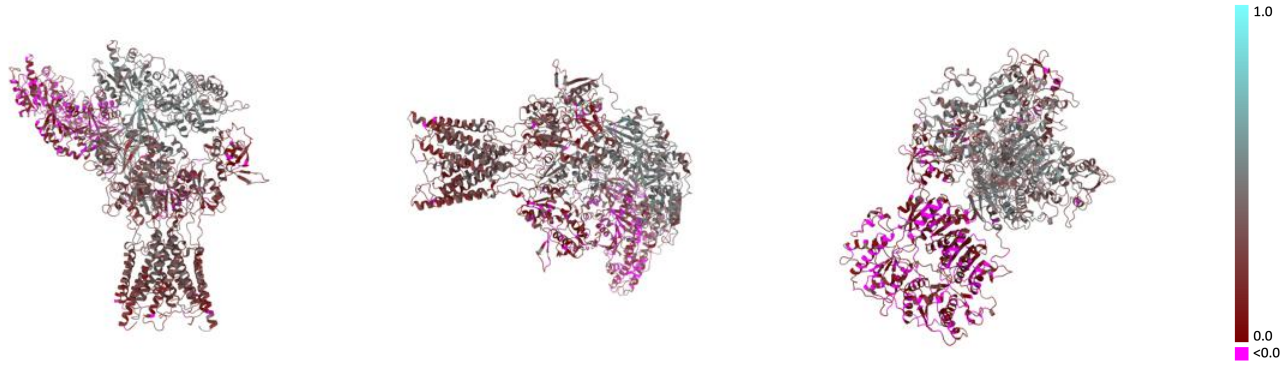
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.25 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model (i)



X Y Z

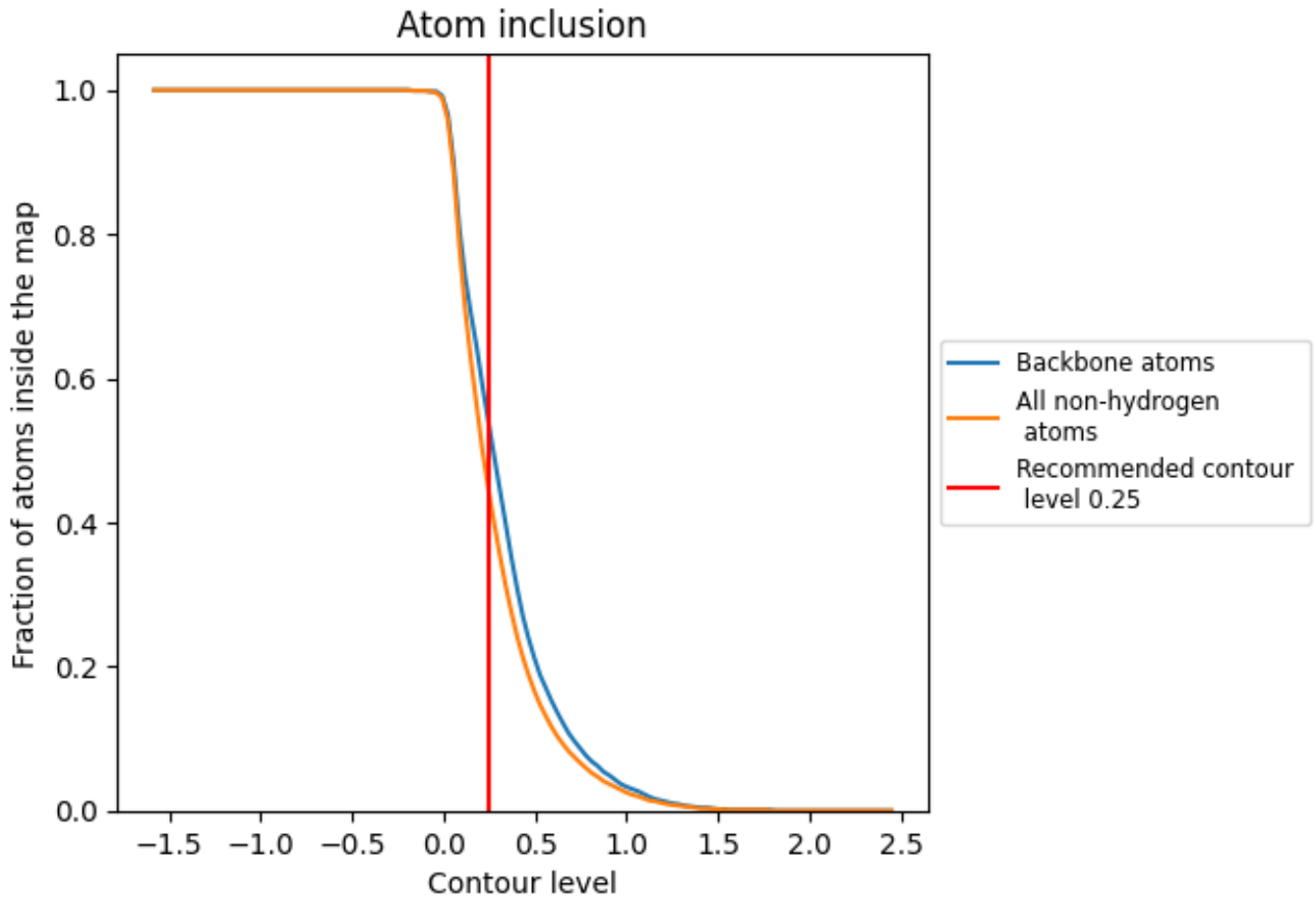
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model (i)

X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.25).

9.4 Atom inclusion (i)



At the recommended contour level, 53% of all backbone atoms, 44% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.25) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.4400	0.2810
A	0.7020	0.3930
B	0.6420	0.3550
C	0.3130	0.2270
D	0.1010	0.1470