wwPDB EM Validation Summary Report (i)

Nov 3, 2026 – 06:27 pm GMT

PDB ID	:	29DS / pdb_000029ds
EMDB ID	:	EMD-57104
Title	:	Cryo-EM structure of dimeric human UGGT1
Authors	:	Aparicio, D.; Guerin, E.M.
Deposited on	:	2026-03-06
Resolution	:	4.55 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
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:

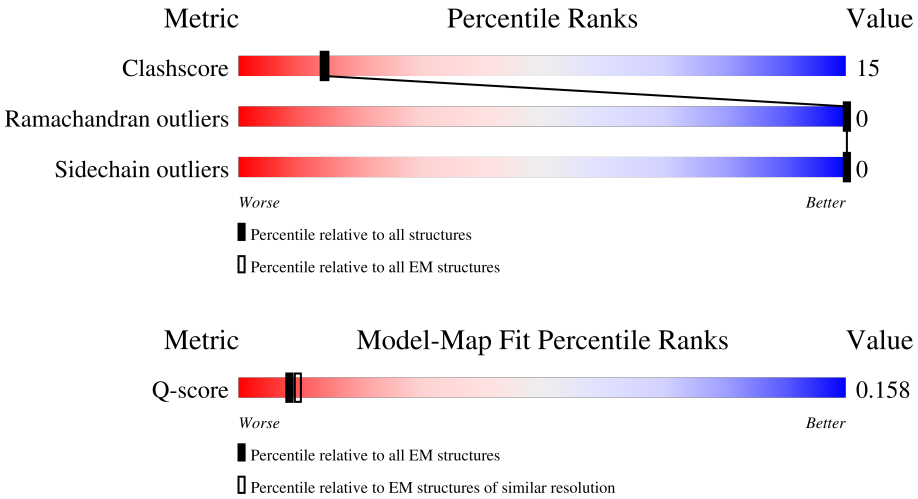
EMDB validation analysis	:	0.0.1.dev133
MolProbity	:	4-5-2 with Phenix2.2
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.51

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 4.55 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	2458 (4.05 - 5.04)

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	1555	21% 73% 16% 12%
1	B	1555	20% 74% 15% 12%

2 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 13649 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 UDP-glucose:glycoprotein glucosyltransferase 1.

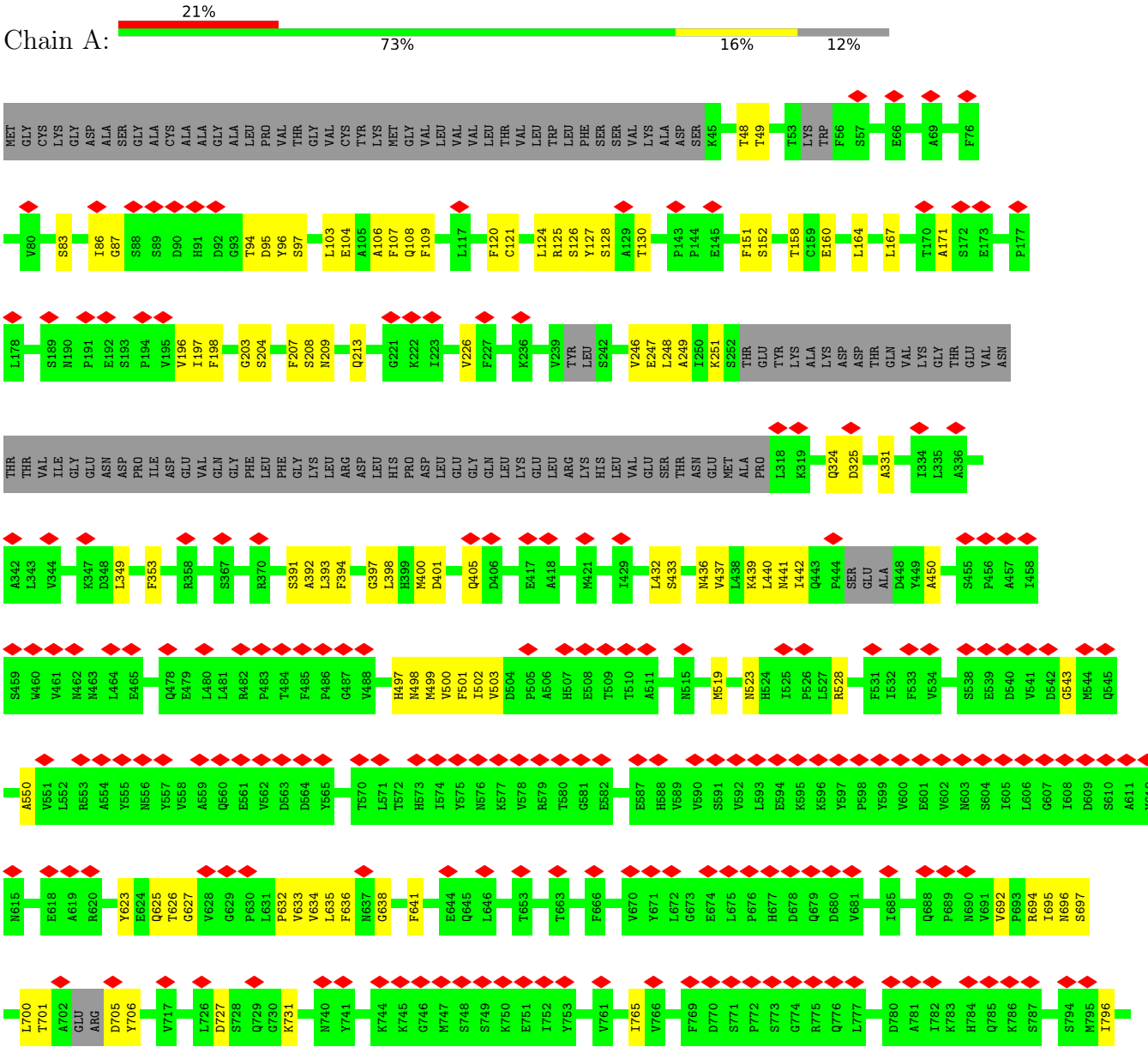
Mol	Chain	Residues	Atoms				AltConf	Trace
1	A	1376	Total 6828	C 4075	N 1376	O 1377	0	0
1	B	1376	Total 6821	C 4069	N 1376	O 1376	0	0

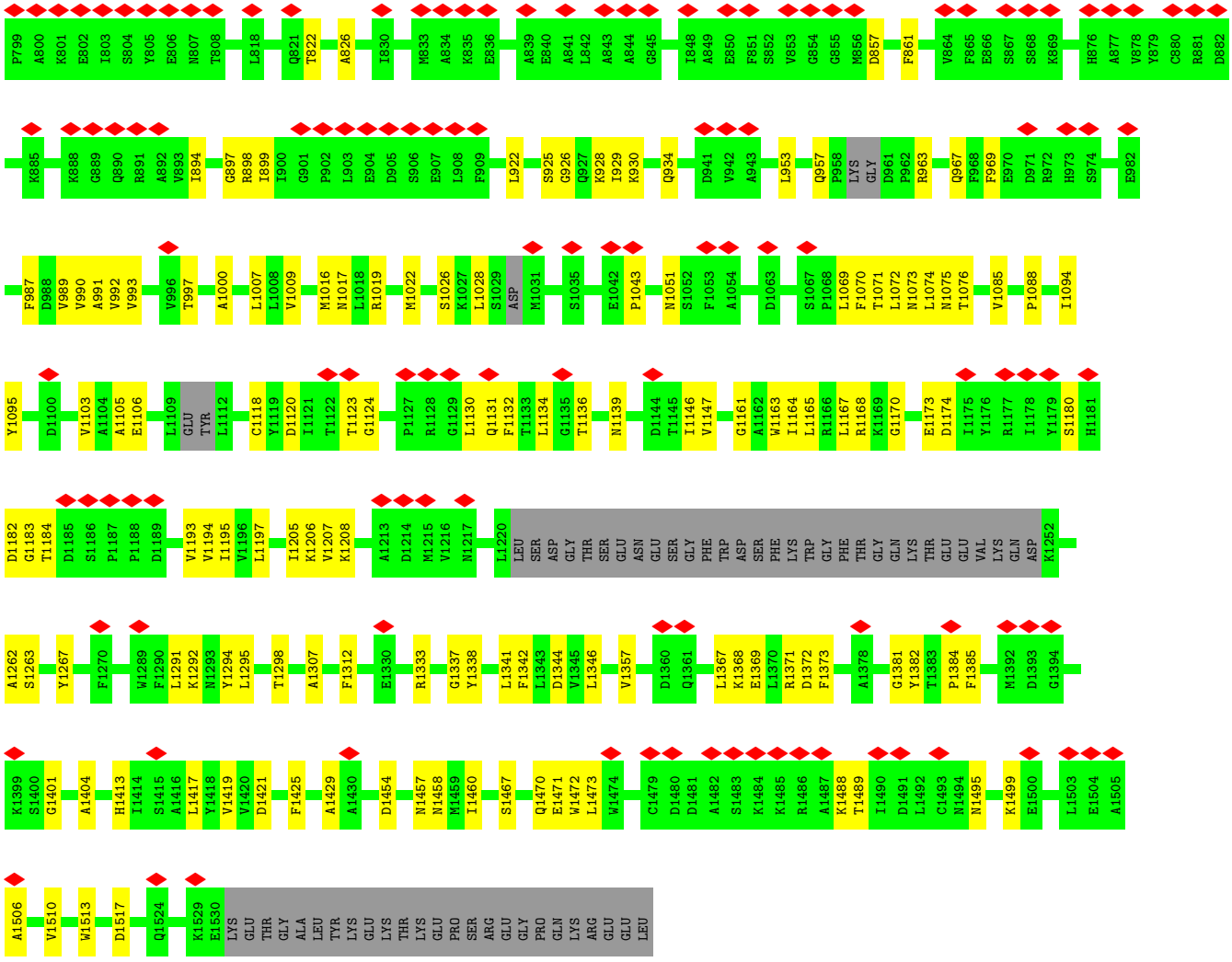
3 Residue-property plots (i)

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: UDP-glucose:glycoprotein glucosyltransferase 1

Chain A:

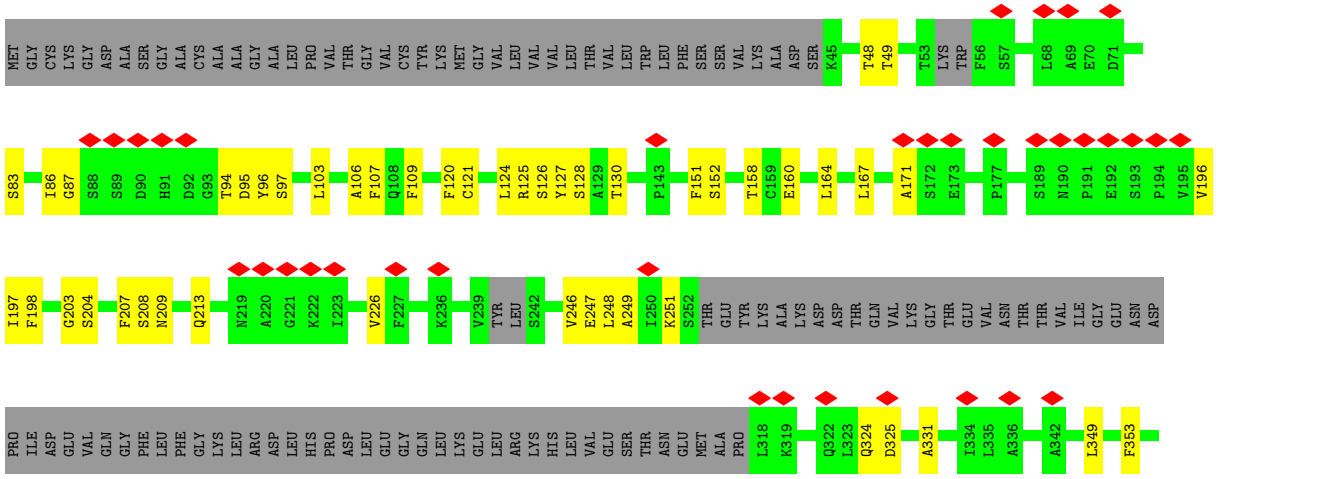


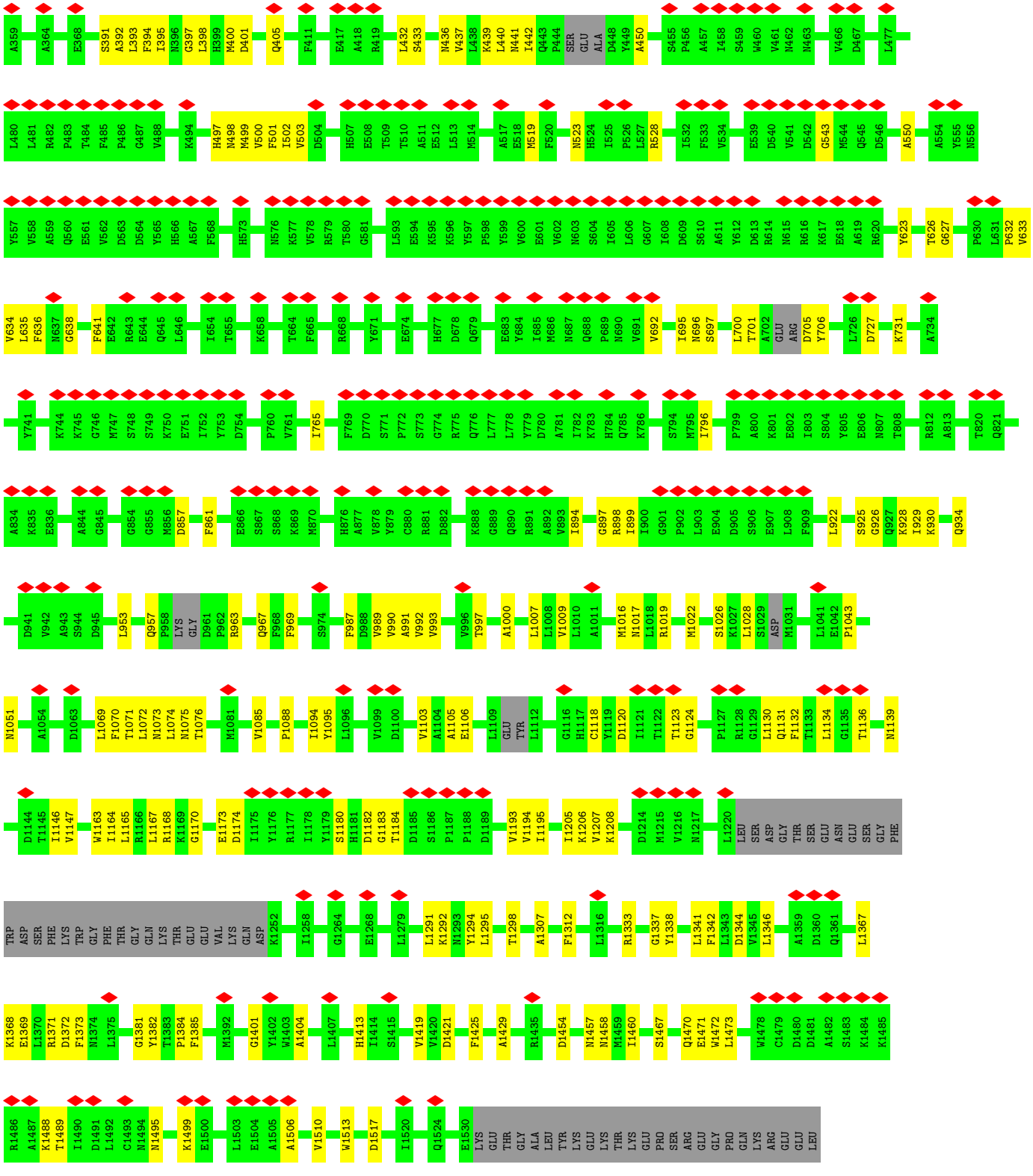


• Molecule 1: UDP-glucose:glycoprotein glucosyltransferase 1

Chain B:






A359 A364 E368 S391 A392 L393 F394 I395 N396 G397 L398 H399 M400 D401 Q405 F411 E417 A418 R419 L432 S433 N436 V437 L438 K439 L440 N441 I442 Q443 P444 SER GLU ALA D448 Y449 A450 S455 P456 A457 I458 S459 W460 V461 N462 N463 V466 D467 L477
L480 L481 R482 P483 T484 F485 P486 G487 V488 K494 H497 N498 M499 V500 F501 I502 V503 D504 H507 E508 T509 T510 A511 E512 L513 M514 A517 E518 H519 F520 N523 H524 I525 P526 L527 R528 T532 F533 V534 E539 D540 V541 D542 G543 M544 Q545 D546 A550 A554 Y555 N556
Y557 V558 A559 Q560 E561 V562 D563 D564 Y565 H566 A567 F568 H573 N576 K577 V578 R579 T580 G581 L593 E594 K595 K596 Y597 P598 Y599 V600 E601 V602 N603 S604 I605 L606 G607 I608 D609 S610 A611 Y612 D613 R614 N615 R616 K617 E618 A619 R620 Y623 T626 G627 P630 L631 P632 V633
V634 L635 F636 N637 G638 F641 E642 R643 E644 Q645 L646 I654 T655 K658 T664 F665 R668 Y671 E674 H677 D678 Q679 E683 Y684 I685 M686 N687 Q688 P689 N690 V691 V692 I695 N696 S697 L700 T701 A702 GLU ARG D705 Y706 L726 D727 K731 A734
Y741 K744 K745 G746 M747 S748 S749 K750 E751 I752 Y753 D754 P760 V761 I765 F769 D770 S771 P772 S773 G774 R775 Q776 L777 L778 Y779 D780 A781 I782 K783 H784 Q785 K786 S794 M795 I796 P799 A800 K801 E802 I803 S804 Y805 E806 N807 T808 R812 A813 T820 Q821
A834 K835 E836 A844 G845 G854 G855 M856 D857 F861 E866 S867 S868 K869 M870 H876 A877 V878 Y879 C880 R881 D882 K888 G889 Q890 R891 A892 V893 I894 G897 R898 I899 I900 G901 P902 L903 E904 D905 S906 E907 L908 F909 L922 S925 G926 Q927 K928 I929 K930 Q934
D941 V942 A943 S944 D945 L953 Q957 P958 LYS GLY D961 P962 R963 Q967 F968 F969 S974 F987 D988 V989 V990 A991 V992 V993 V996 T997 A1000 L1007 L1008 V1009 L1010 A1011 M1016 N1017 L1018 R1019 M1022 S1026 K1027 L1028 S1029 ASP M1031 L1041 E1042 P1043
N1051 A1054 D1063 L1069 F1070 T1071 L1072 N1073 L1074 N1075 T1076 M1081 V1085 P1088 I1094 Y1095 L1096 V1099 D1100 V1103 A1104 A1105 E1106 L1109 GLU TYR L1112 G1116 H1117 C1118 Y1119 D1120 I1121 T1122 T1123 G1124 P1127 R1128 G1129 L1130 Q1131 F1132 T1133 L1134 G1135 T1136 N1139
D1144 T1145 I1146 V1147 W1163 I1164 L1165 R1166 L1167 R1168 K1169 G1170 E1173 D1174 I1175 Y1176 R1177 I1178 Y1179 S1180 H1181 D1182 G1183 T1184 D1185 S1186 P1187 P1188 D1189 V1193 V1194 I1195 I1205 K1206 V1207 K1208 D1214 M1215 V1216 N1217 L1220 LEU SER ASP GLY THR SER GLU ASN GLU SER GLY PHE
TRP ASP SER PHE LYS TRP GLY PHE THR GLY GLN LYS THR GLU GLU VAL LYS GLN ASP K1252 I1258 G1264 E1268 L1279 L1291 K1292 N1293 Y1294 L1295 T1298 A1307 F1312 L1316 R1333 G1337 Y1338 L1341 F1342 L1343 D1344 V1345 L1346 A1359 D1360 Q1361 L1367
K1368 E1369 L1370 R1371 D1372 F1373 N1374 L1375 G1381 Y1382 T1383 P1384 F1385 M1392 G1401 Y1402 W1403 A1404 L1407 H1413 I1414 S1415 V1419 V1420 D1421 F1425 A1429 R1435 D1454 N1457 N1458 M1459 I1460 S1467 Q1470 E1471 W1472 L1473 W1478 C1479 D1480 D1481 A1482 S1483 K1484 K1485
R1486 A1487 K1488 T1489 I1490 D1491 L1492 C1493 N1494 N1495 K1499 E1500 L1503 E1504 A1505 A1506 V1510 W1513 D1517 I1520 Q1524 E1530 LYS GLU THR GLY ALA LEU TYR LYS GLU LYS THR LYS GLU PRO SER ARG GLU GLY PRO GLN LYS ARG GLU GLU LEU

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, POINT	Depositor
Number of particles used	11569, 11569	Depositor
Resolution determination method	FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION, PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	52	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K2 BASE (4k x 4k)	Depositor
Maximum map value	2.028	Depositor
Minimum map value	-0.002	Depositor
Average map value	0.003	Depositor
Map value standard deviation	0.040	Depositor
Recommended contour level	0.05	Depositor
Map size (Å)	253.44, 253.44, 253.44	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.66, 0.66, 0.66	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	0.33	0/6819	0.54	2/9495 (0.0%)
1	B	0.33	0/6811	0.54	2/9484 (0.0%)
All	All	0.33	0/13630	0.54	4/18979 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	1346	LEU	CA-C-N	-6.70	105.44	121.80
1	B	1346	LEU	C-N-CA	-6.70	105.44	121.80
1	A	1346	LEU	CA-C-N	-6.70	105.45	121.80
1	A	1346	LEU	C-N-CA	-6.70	105.45	121.80

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	6828	0	3015	155	0
1	B	6821	0	3008	150	0
All	All	13649	0	6023	304	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 15.

The worst 5 of 304 close contacts within the same asymmetric unit are listed below, sorted by

their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1263:SER:O	1:A:1267:TYR:CD2	2.18	0.96
1:B:433:SER:O	1:B:437:VAL:N	2.05	0.90
1:A:433:SER:O	1:A:437:VAL:N	2.05	0.89
1:A:324:GLN:O	1:A:1028:LEU:N	2.08	0.87
1:B:925:SER:O	1:B:929:ILE:N	2.08	0.86

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	1356/1555 (87%)	1204 (89%)	152 (11%)	0	100	100
1	B	1356/1555 (87%)	1205 (89%)	151 (11%)	0	100	100
All	All	2712/3110 (87%)	2409 (89%)	303 (11%)	0	100	100

There are no Ramachandran outliers to report.

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	1/1377 (0%)	1 (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. There are no such sidechains identified.

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

There are no chain breaks in this entry.

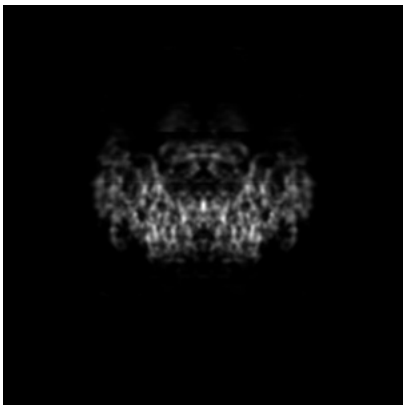
6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-57104. These allow visual inspection of the internal detail of the map and identification of artifacts.

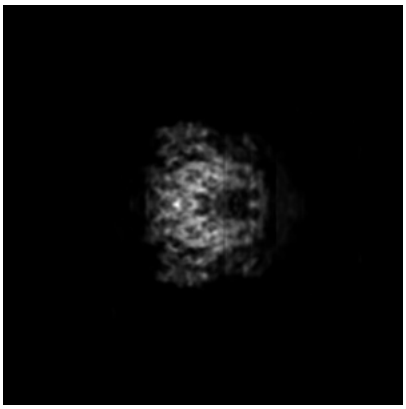
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections (i)

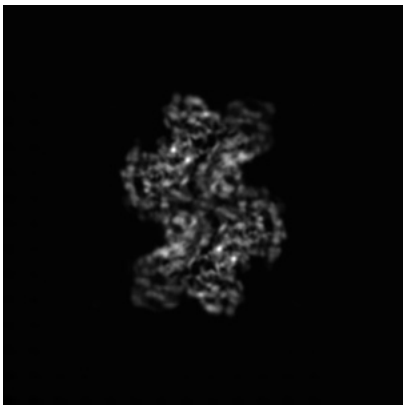
6.1.1 Primary map



X

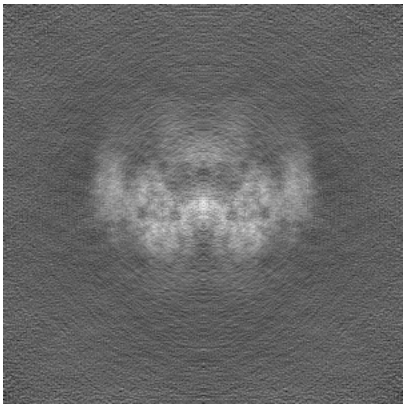


Y

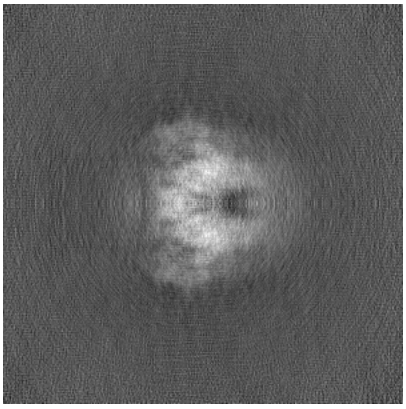


Z

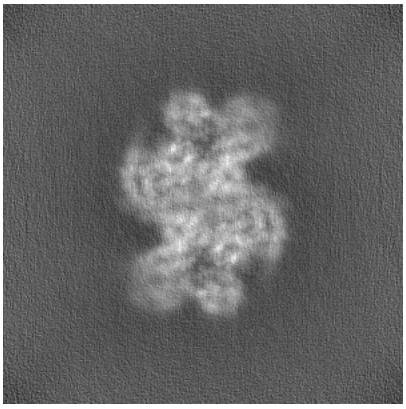
6.1.2 Raw map



X



Y



Z

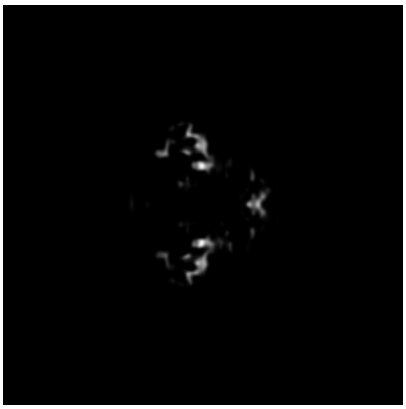
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

6.2.1 Primary map



X Index: 192

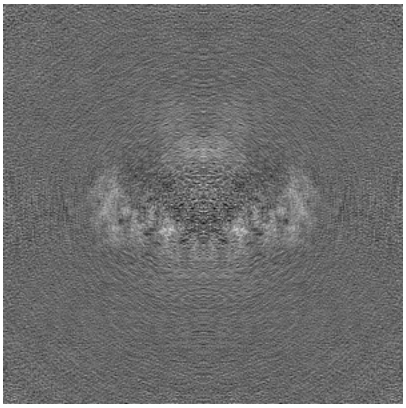


Y Index: 192

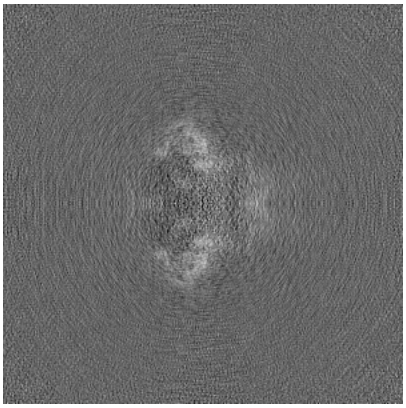


Z Index: 192

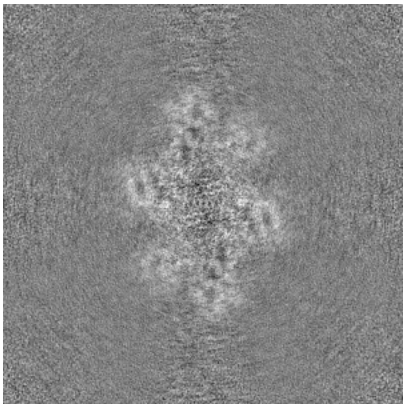
6.2.2 Raw map



X Index: 192



Y Index: 192



Z Index: 192

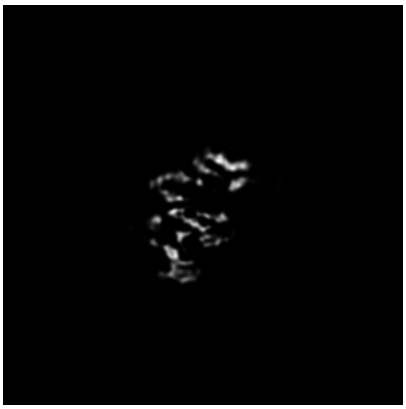
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

6.3.1 Primary map



X Index: 164

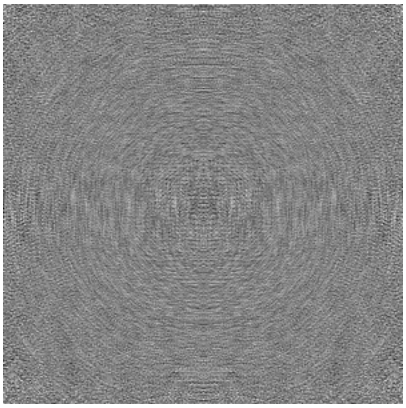


Y Index: 238

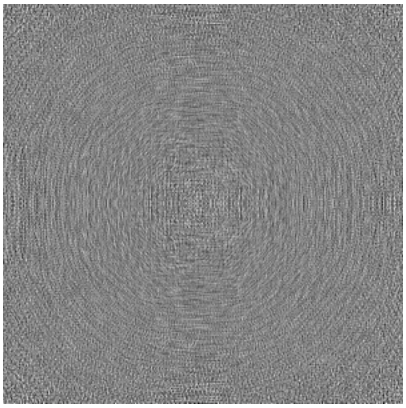


Z Index: 179

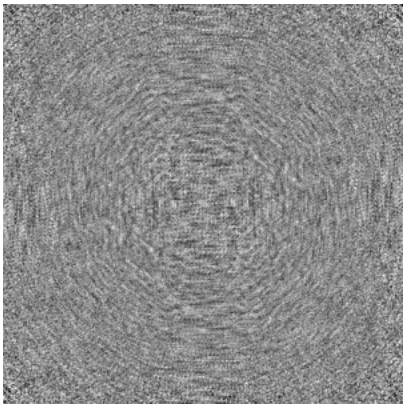
6.3.2 Raw map



X Index: 0



Y Index: 0

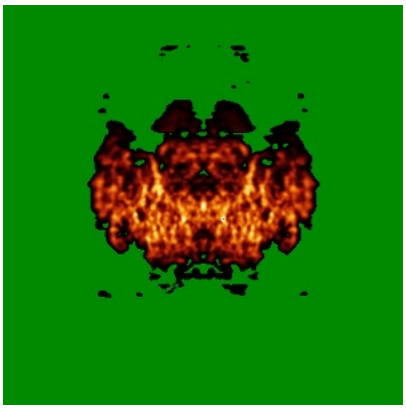


Z Index: 383

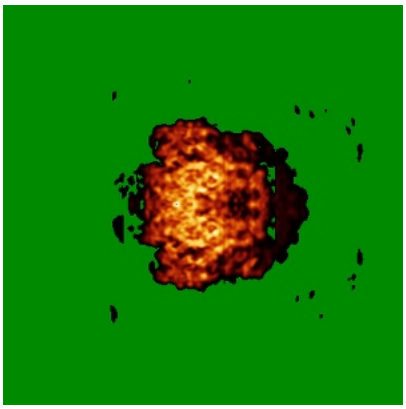
The images above show the largest variance slices of the map in three orthogonal directions.

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

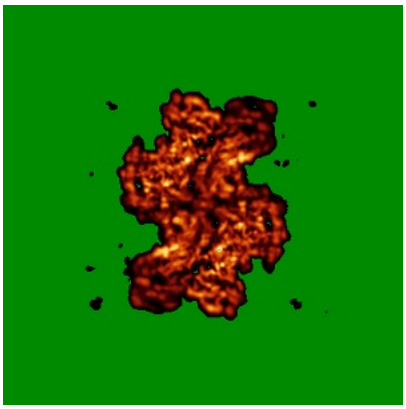
6.4.1 Primary map



X

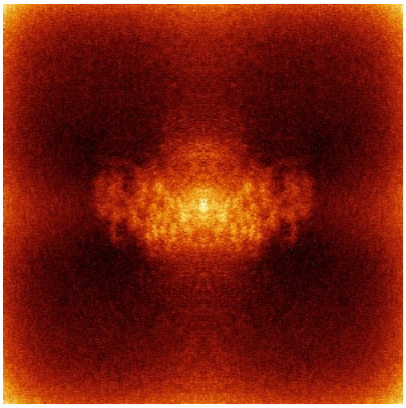


Y

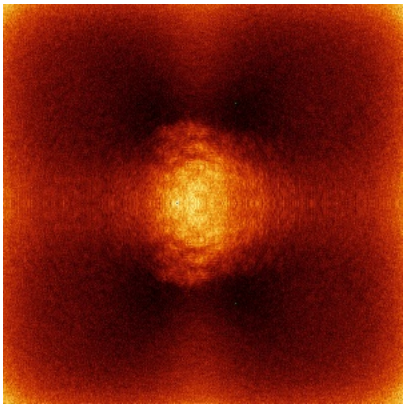


Z

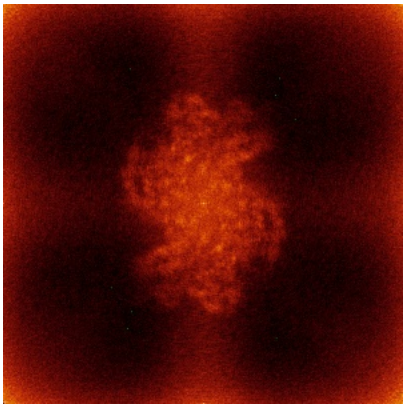
6.4.2 Raw map



X



Y

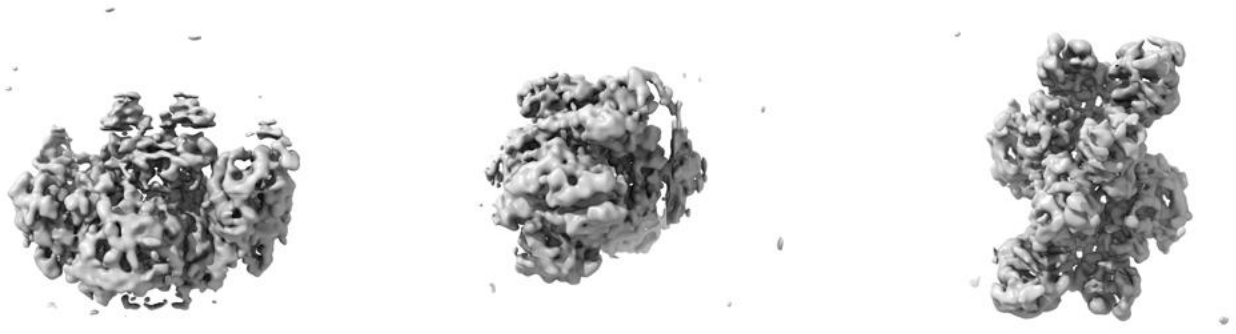


Z

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)

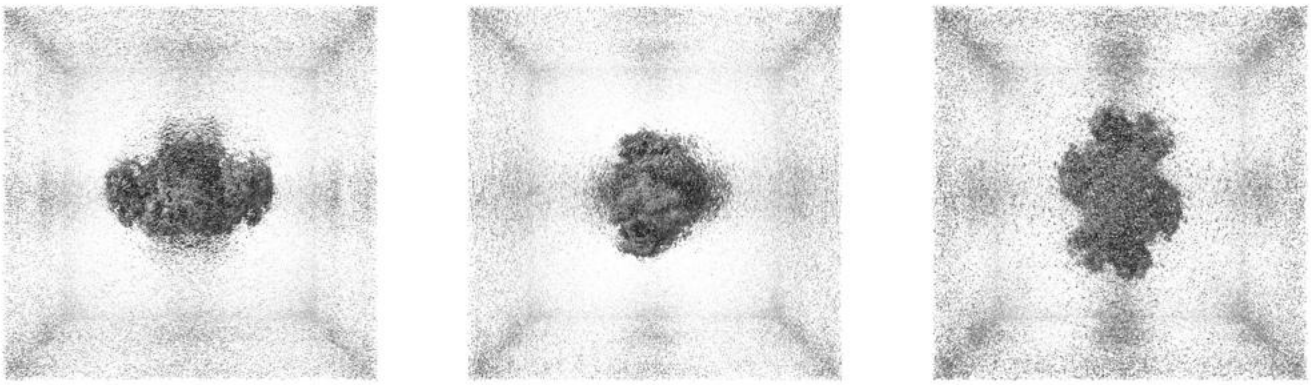
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.05. 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.

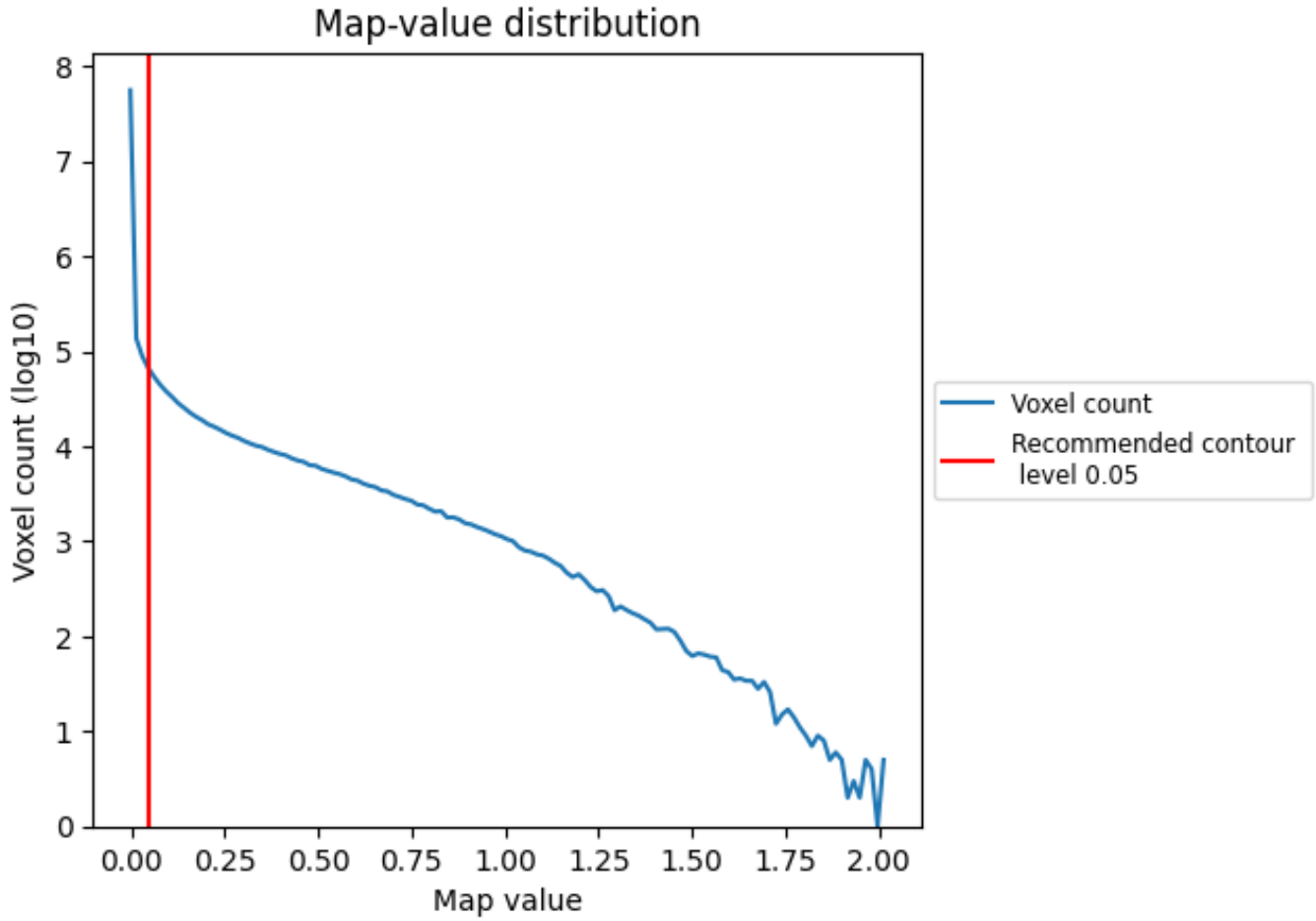
6.6 Mask visualisation (i)

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

7 Map analysis

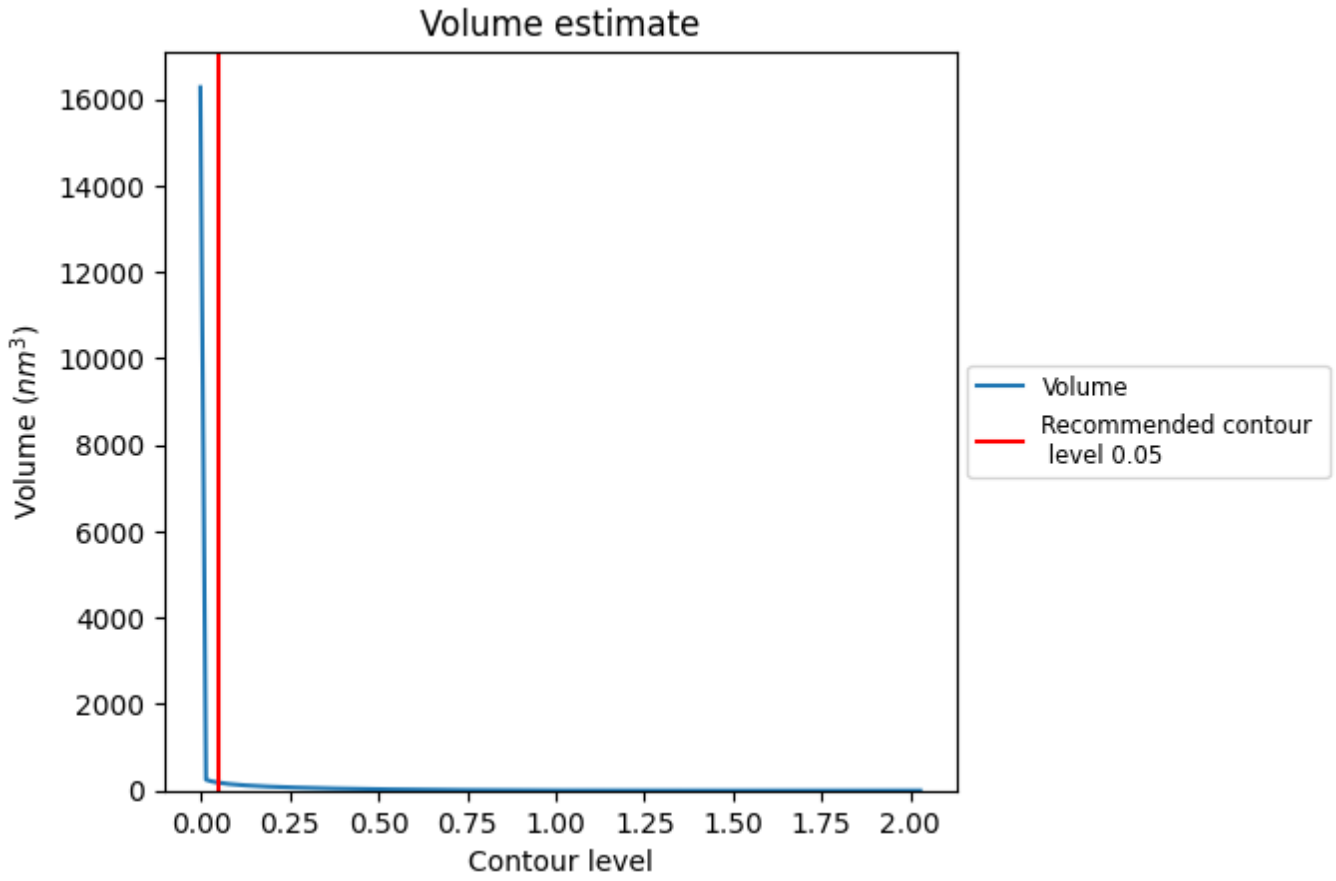
This section contains the results of statistical analysis of the map.

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.

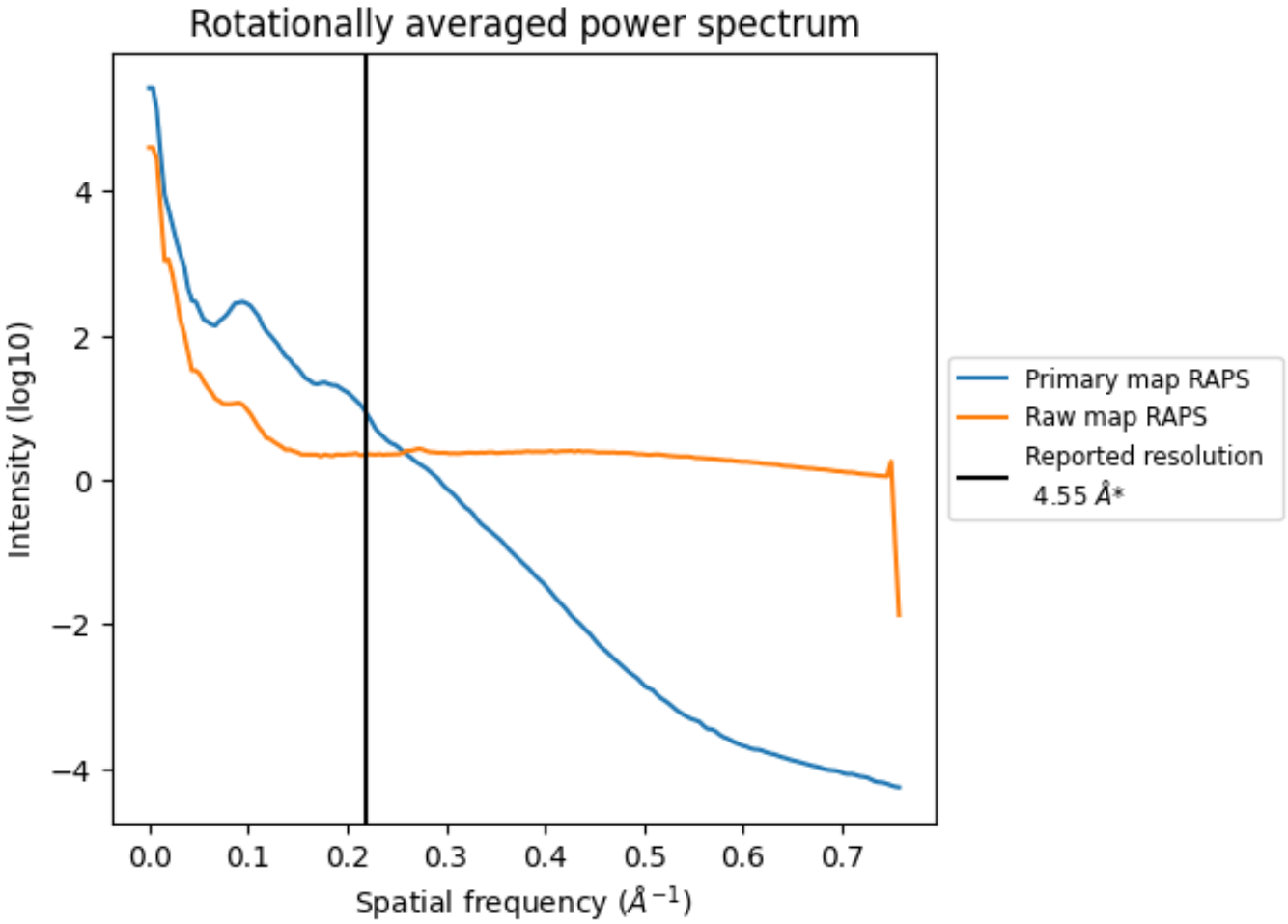
7.2 Volume estimate (i)



The volume at the recommended contour level is 183 nm^3; this corresponds to an approximate mass of 165 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)

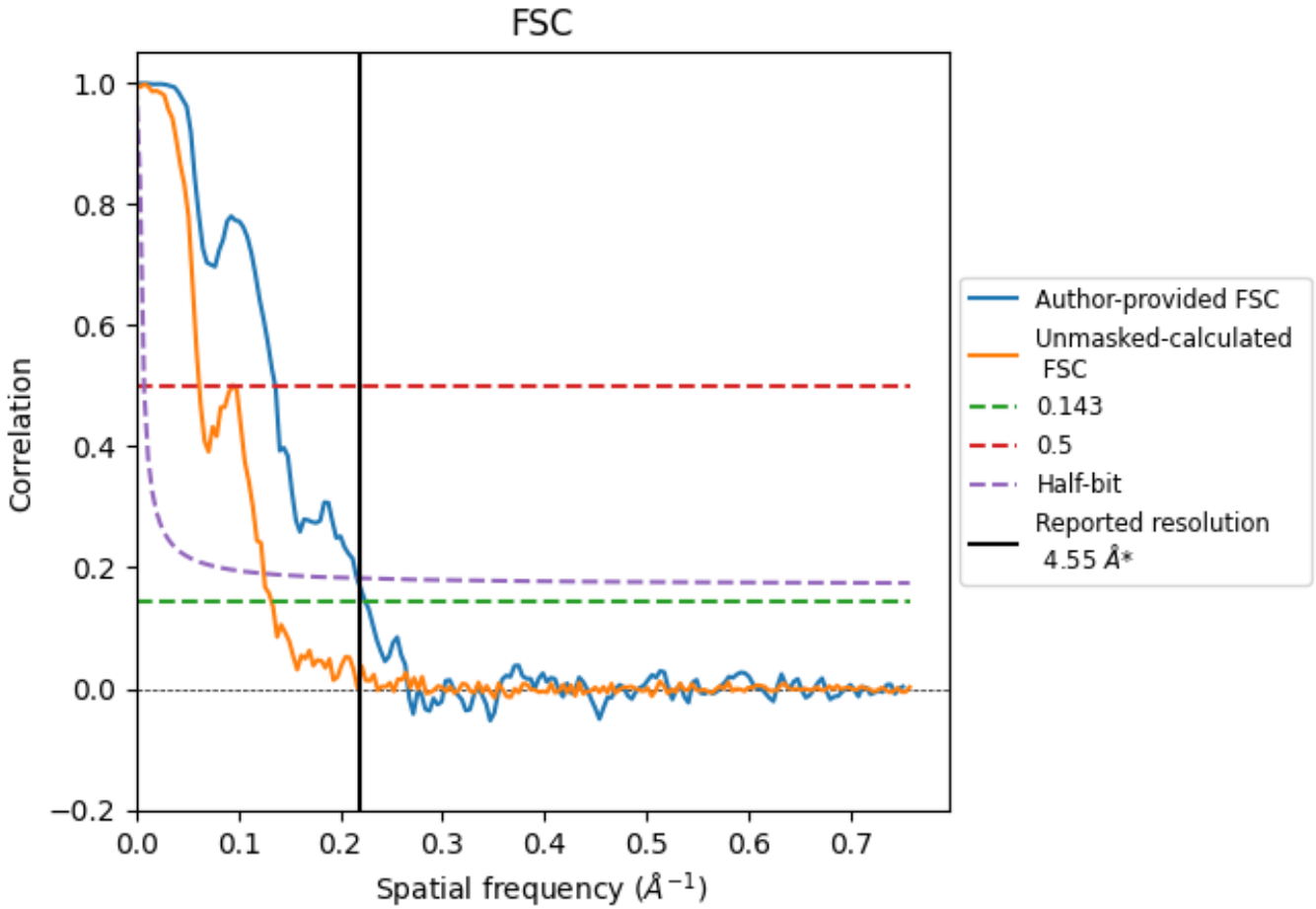


*Reported resolution corresponds to spatial frequency of 0.220 Å^{-1}

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 0.220 $Å^{-1}$

8.2 Resolution estimates (i)

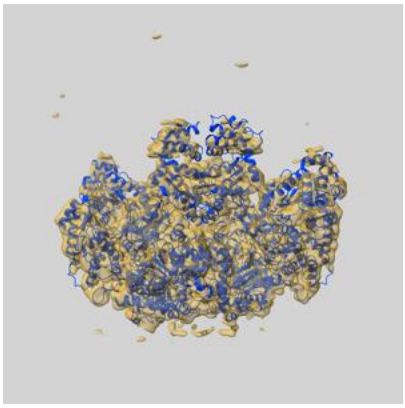
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	-	-	-
Author-provided FSC curve	4.45	7.33	4.63
Unmasked-calculated*	7.54	16.18	7.99

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

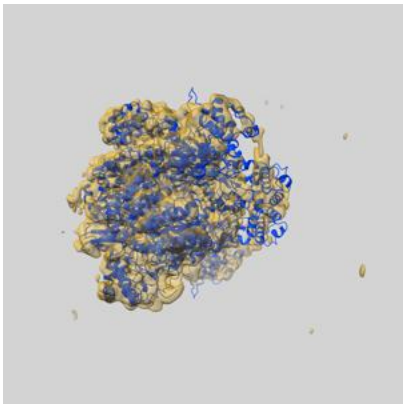
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-57104 and PDB model 29DS. Per-residue inclusion information can be found in section 3 on page 4.

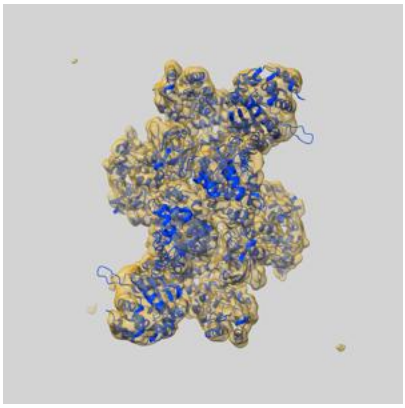
9.1 Map-model overlay



X



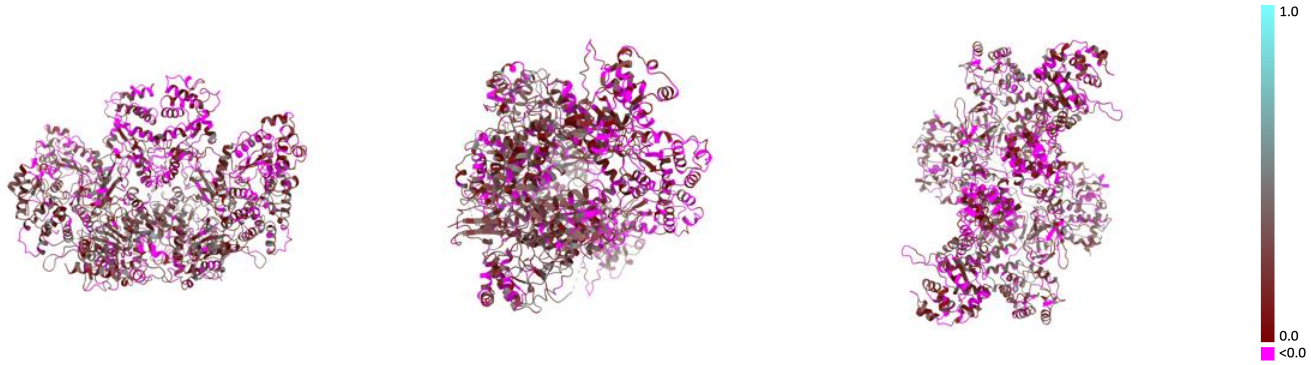
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.05 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.

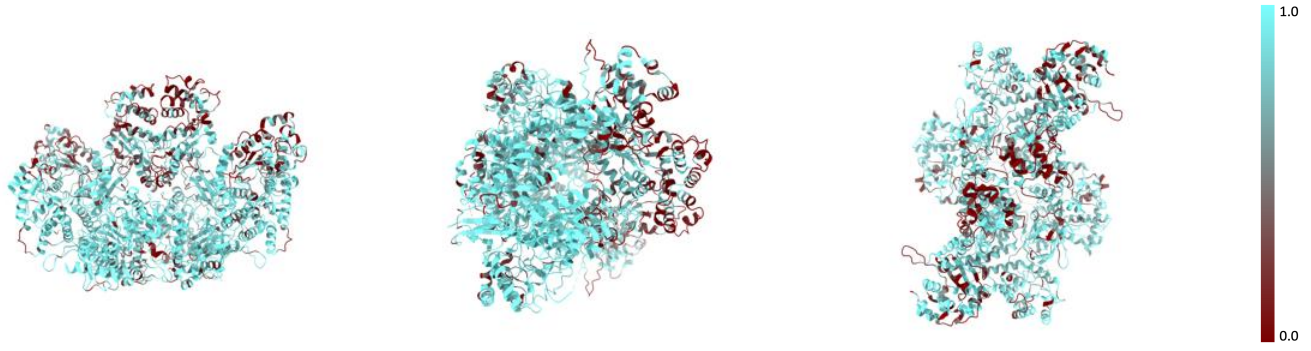
9.2 Q-score mapped to coordinate model (i)



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.

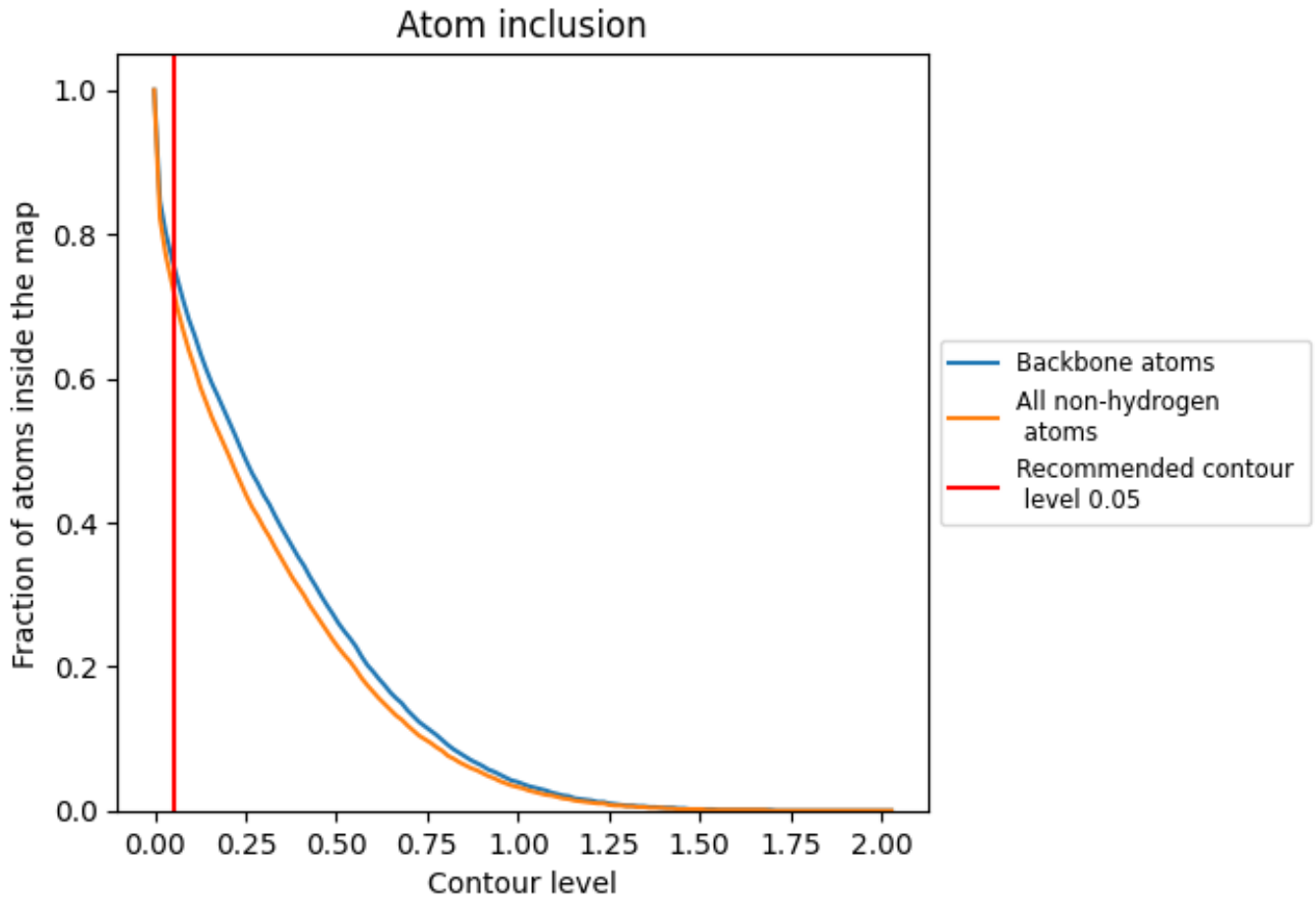
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.05).

9.4 Atom inclusion (i)



At the recommended contour level, 76% of all backbone atoms, 72% 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 (0.05) and Q-score for the entire model and for each chain.



Chain	Atom inclusion	Q-score
All	0.7240	0.1580
A	0.7140	0.1500
B	0.7330	0.1660