Full wwPDB EM Validation Report

Jun 17, 2025 – 03:16 AM JST

PDB ID	:	8WLA / pdb_00008wla
EMDB ID	:	EMD-37614
Title	:	Cryo-EM structure of the beta-1,3-glucan synthase FKS1-Rho1 complex
Authors	:	Li, J.L.; Zhu, A.Q.; Liu, J.X.; Dai, X.L.; Yan, C.Y.; Deng, D.; Wang, X.
Deposited on	:	2023-09-29
Resolution	:	3.40 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:

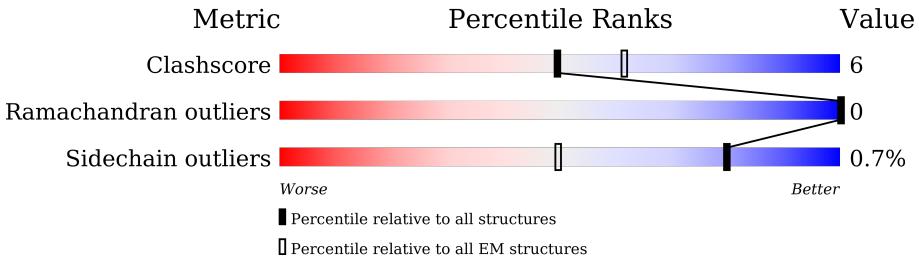
EMDB validation analysis	:	0.0.1.dev118
MolProbity	:	4-5-2 with Phenix2.0rc1
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.44

1 Overall quality at a glance (i)

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

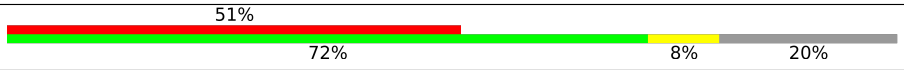
The reported resolution of this entry is 3.40 Å.

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)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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	209	
2	B	1876	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 13360 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 GTP-binding protein RHO1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	178	1383	873	234	269	7	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	68	HIS	GLN	engineered mutation	UNP P06780

- Molecule 2 is a protein called 1,3-beta-glucan synthase component FKS1.

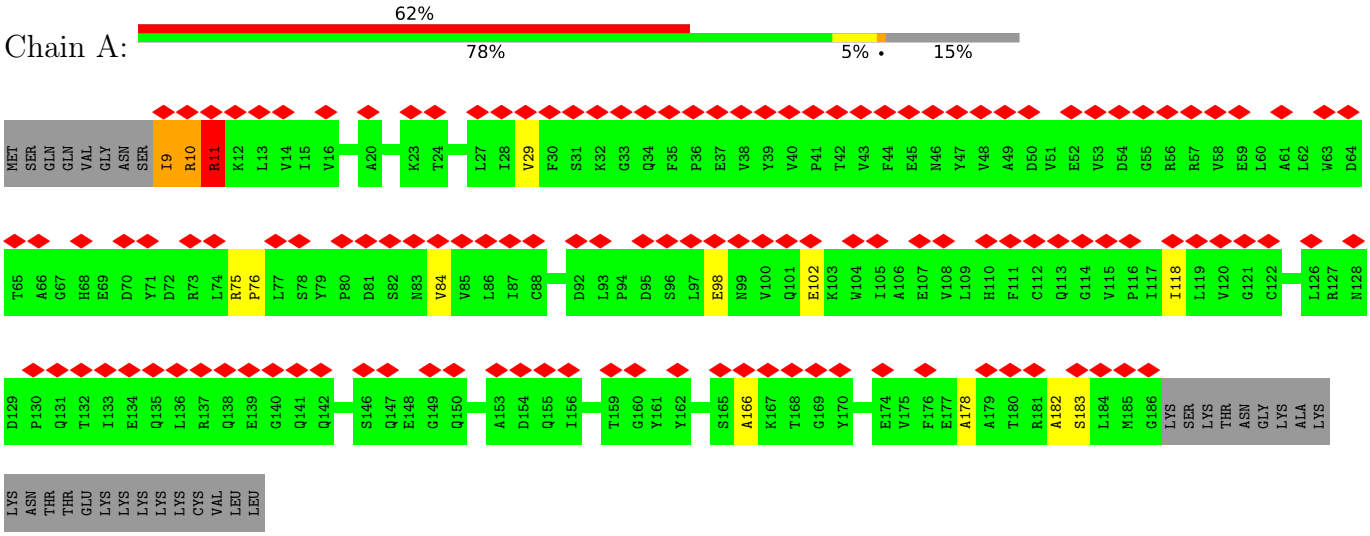
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	1492	11977	7799	2015	2090	73	0	0

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.

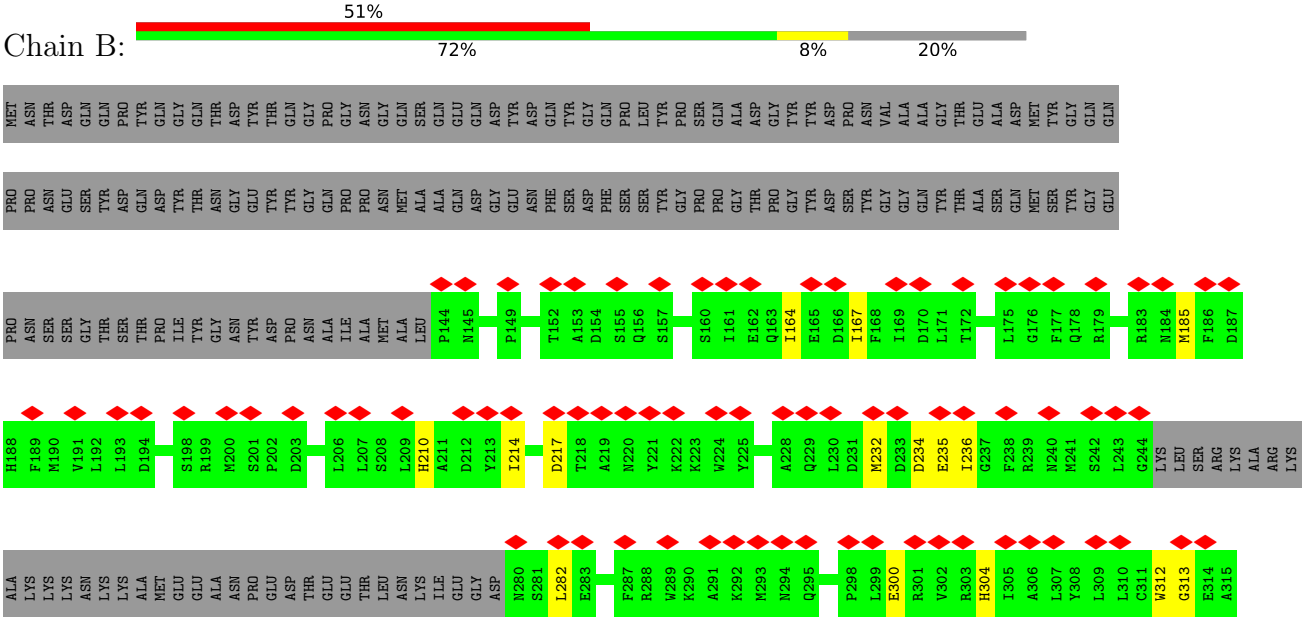
• Molecule 1: GTP-binding protein RHO1

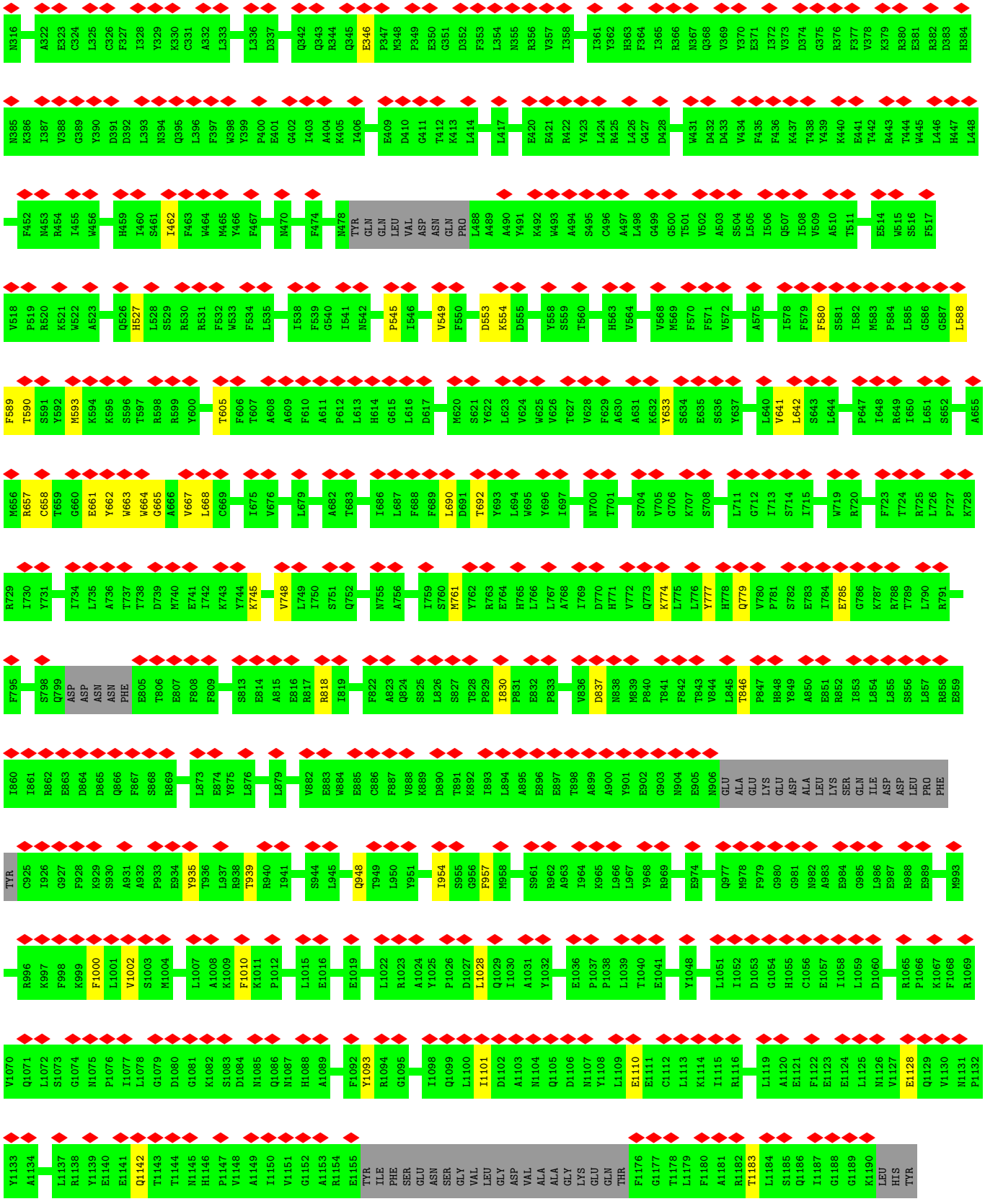
Chain A:

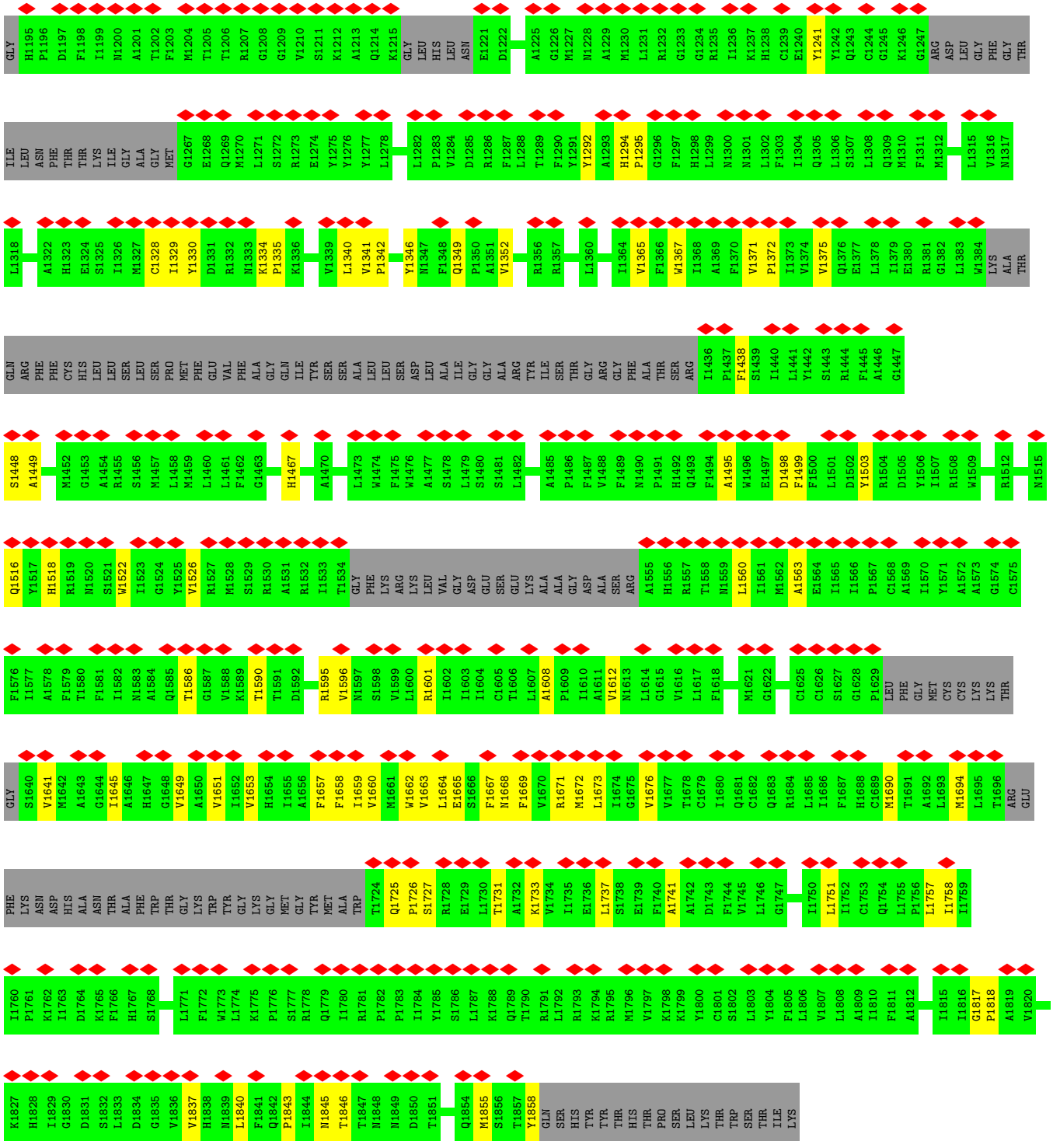


• Molecule 2: 1,3-beta-glucan synthase component FKS1

Chain B:




N316 A322 E323 C324 L325 C326 F327 I328 Y329 K330 C331 A332 L333 L336 D337 Q342 Q343 R344 Q345 E346 P347 M348 P349 E350 G351 D352 F353 L354 N355 R356 V357 I358 I361 Y362 H363 F364 I365 R366 N367 Q368 V369 Y370 E371 I372 V373 D374 G375 R376 F377 V378 K379 R380 E381 R382 D383 H384
N385 K386 I387 V388 G389 Y390 D391 D392 L393 N394 Q395 L396 F397 W398 Y399 P400 E401 G402 I403 A404 K405 I406 E409 D410 G411 T412 K413 L414 L417 E420 E421 R422 Y423 L424 R425 L426 G427 D428 W431 D432 D433 V434 F435 F436 K437 T438 Y439 K440 E441 T442 R443 T444 W445 L446 H447 L448
F452 N453 R454 I455 W456 H459 I460 S461 I462 F463 W464 M465 Y466 F467 N470 F474 N478 TYR GLN GLN LEU VAL ASP ASN GLN PRO L488 A489 A490 Y491 K492 W493 A494 S495 C496 A497 L498 G499 G500 T501 V502 A503 S504 L505 I506 Q507 I508 V509 A510 T511 E514 W515 S516 F517
V518 P519 R520 K521 W522 A523 Q526 H527 L528 S529 R530 R531 F532 W533 F534 L535 I538 F539 G540 I541 N542 P545 I546 V549 F550 D553 K554 D555 Y558 S559 T560 H563 V564 V568 M569 F570 F571 V572 A575 I578 F579 F580 S581 I582 M583 P584 L585 G586 G587 L588
F589 T590 S591 Y592 M593 K594 K595 S596 T597 R598 R599 Y600 T605 F606 T607 A608 A609 F610 A611 P612 L613 H614 G615 L616 D617 M620 S621 Y622 L623 V624 W625 V626 T627 V628 F629 A630 A631 K632 Y633 S634 E635 S636 Y637 L640 V641 L642 S643 L644 P647 I648 R649 I650 L651 S652 A655
M656 R657 C658 T659 G660 E661 Y662 W663 W664 G665 A666 V667 L668 C669 I675 V676 L679 A682 T683 I686 L687 F688 F689 L690 D691 T692 Y693 L694 W695 Y696 I697 N700 T701 S704 V705 G706 K707 S708 L711 G712 I713 S714 I715 W719 R720 F723 T724 R725 L726 P727 K728
R729 I730 Y731 I734 L735 A736 T737 T738 D739 M740 E741 I742 K743 Y744 K745 V748 L749 I750 S751 Q752 N755 A756 I759 S760 M761 Y762 R763 E764 H765 L766 L767 A768 I769 D770 H771 V772 Q773 K774 L775 L776 Y777 H778 Q779 V780 P781 S782 E783 I784 E785 G786 K787 R788 T789 L790 R791
F795 S798 Q799 ASP ASP ASN ASN PHE E805 T806 E807 F808 F809 S813 E814 A815 E816 R817 R818 I819 F822 A823 Q824 S825 L826 S827 T828 P829 I830 P831 E832 P833 V836 D837 N838 M839 P840 T841 F842 T843 V844 L845 T846 P847 H848 Y849 A850 E851 R852 I853 L854 L855 S856 L857 R858 E859
I860 I861 R862 E863 D864 D865 Q866 F867 S868 R869 L873 E874 Y875 L876 L879 V882 E883 W884 E885 C886 F887 V888 K889 D890 T891 K892 I893 L894 A895 E896 E897 T898 A899 A900 Y901 E902 G903 N904 E905 N906 GLU ALA GLU LYS GLU ASP ALA LEU LYS SER GLN ILE ASP ASP LEU PRO PHE
TYR C925 I926 G927 F928 K929 S930 A931 A932 P933 E934 Y935 T936 L937 R938 T939 R940 I941 S944 L945 Q948 T949 L950 Y951 I954 S955 G956 F957 M958 S961 R962 A963 I964 K965 L966 L967 Y968 R969 E974 Q977 M978 F979 G980 G981 N982 A983 E984 G985 L986 E987 R988 E989 M993
R996 K997 F998 K999 F1000 L1001 V1002 S1003 M1004 L1007 A1008 K1009 F1010 K1011 P1012 L1015 E1016 E1019 L1022 R1023 A1024 Y1025 P1026 D1027 L1028 Q1029 I1030 A1031 Y1032 E1036 P1037 P1038 L1039 T1040 E1041 Y1048 L1051 I1052 D1053 G1054 H1055 C1056 E1057 I1058 L1059 D1060 R1065 P1066 K1067 F1068 R1069
V1070 Q1071 L1072 S1073 G1074 N1075 P1076 I1077 L1078 G1079 D1080 G1081 K1082 S1083 D1084 N1085 Q1086 N1087 H1088 A1089 F1092 Y1093 R1094 G1095 I1098 Q1099 L1100 I1101 D1102 A1103 N1104 Q1105 D1106 N1107 Y1108 L1109 E1110 E1111 C1112 L1113 K1114 I1115 R1116 L1119 A1120 E1121 F1122 E1123 E1124 L1125 N1126 V1127 E1128 Q1129 V1130 N1131 P1132
Y1133 A1134 L1137 R1138 Y1139 E1140 E1141 Q1142 T1143 T1144 N1145 H1146 P1147 V1148 A1149 I1150 V1151 G1152 A1153 R1154 E1155 TYR ILE PHE SER GLU ASN SER GLY VAL LEU GLY ASP VAL ALA ALA GLY LYS GLU GLN THR F1176 G1177 T1178 L1179 F1180 A1181 R1182 T1183 L1184 S1185 Q1186 I1187 G1188 G1189 K1190 LEU HIS TYR


GLY H1195 P1196 D1197 F1198 I1199 N1200 A1201 T1202 F1203 M1204 T1205 T1206 R1207 G1208 G1209 V1210 S1211 K1212 A1213 Q1214 K1215 GLY LEU HIS LEU ASN E1221 D1222 A1225 G1226 M1227 N1228 A1229 M1230 L1231 R1232 G1233 G1234 R1235 I1236 K1237 H1238 C1239 E1240 Y1241 Y1242 Q1243 C1244 G1245 K1246 G1247 ARG ASP LEU GLY PHE GLY THR
ILE LEU ASN PHE THR THR LYS ILE GLY ALA GLY MET G1267 E1268 Q1269 M1270 L1271 S1272 R1273 E1274 Y1275 Y1276 Y1277 L1278 L1282 P1283 V1284 D1285 R1286 F1287 L1288 T1289 F1290 Y1291 Y1292 A1293 H1294 P1295 G1296 F1297 H1298 L1299 N1300 N1301 L1302 F1303 I1304 Q1305 L1306 S1307 L1308 Q1309 M1310 F1311 M1312 L1315 V1316 N1317
L1318 A1322 H1323 E1324 S1325 I1326 M1327 C1328 I1329 Y1330 D1331 R1332 N1333 K1334 P1335 K1336 V1339 L1340 V1341 P1342 Y1346 N1347 F1348 Q1349 P1350 A1351 V1352 R1356 R1357 L1360 I1364 V1365 F1366 W1367 I1368 A1369 F1370 V1371 P1372 I1373 V1374 V1375 Q1376 E1377 L1378 I1379 E1380 R1381 G1382 L1383 W1384 LYS ALA THR
GLN ARG PHE PHE CYS HIS LEU LEU SER LEU SER PRO MET PHE GLU VAL PHE ALA GLY GLN ILE TYR SER SER ALA LEU LEU LEU SER ASP LEU ALA ILE GLY GLY ALA ARG TYR ILE SER THR GLY ARG GLY PHE ALA THR SER ARG I1436 P1437 F1438 S1439 I1440 L1441 Y1442 S1443 R1444 F1445 A1446 G1447
S1448 A1449 M1452 G1453 A1454 R1455 S1456 M1457 L1458 M1459 L1460 L1461 F1462 G1463 H1467 A1470 L1473 W1474 F1475 W1476 A1477 S1478 L1479 S1480 S1481 L1482 A1485 P1486 F1487 V1488 F1489 N1490 P1491 H1492 Q1493 F1494 A1495 W1496 E1497 D1498 F1499 F1500 L1501 D1502 Y1503 R1504 D1505 Y1506 I1507 R1508 W1509 R1512 N1515
Q1516 Y1517 H1518 R1519 N1520 S1521 W1522 I1523 G1524 Y1525 V1526 R1527 M1528 S1529 R1530 A1531 R1532 I1533 T1534 GLY PHE LYS ARG LYS LEU VAL GLY ASP GLU SER GLU LYS ALA ALA GLY ASP ALA SER ARG A1555 H1556 R1557 T1558 N1559 L1560 I1561 M1562 A1563 E1564 I1565 I1566 P1567 C1568 A1569 I1570 Y1571 A1572 A1573 G1574 C1575
F1576 I1577 A1578 F1579 T1580 F1581 I1582 N1583 A1584 Q1585 T1586 G1587 V1588 K1589 T1590 T1591 D1592 R1595 V1596 N1597 S1598 V1599 L1600 R1601 I1602 I1603 I1604 C1605 T1606 L1607 A1608 P1609 I1610 A1611 V1612 N1613 L1614 G1615 V1616 L1617 F1618 M1621 G1622 C1625 C1626 S1627 G1628 P1629 LEU PHE GLY MET CYS CYS LYS LYS THR
GLY S1640 V1641 M1642 A1643 G1644 I1645 A1646 H1647 G1648 V1649 A1650 V1651 T1652 V1653 H1654 I1655 A1656 F1657 F1658 I1659 V1660 M1661 W1662 V1663 L1664 E1665 S1666 F1667 N1668 F1669 V1670 R1671 M1672 L1673 T1674 G1675 V1676 V1677 T1678 C1679 I1680 Q1681 C1682 Q1683 R1684 L1685 I1686 F1687 H1688 C1689 M1690 T1691 A1692 I1693 M1694 L1695 T1696 ARG GLU
PHE LYS ASN ASP HIS ALA ASN THR ALA PHE TRP THR GLY LYS TRP TYR GLY LYS GLY MET GLY TYR MET ALA TRP T1724 Q1725 P1726 S1727 R1728 E1729 L1730 T1731 A1732 K1733 V1734 I1735 E1736 L1737 S1738 E1739 F1740 A1741 A1742 D1743 F1744 V1745 L1746 G1747 I1750 L1751 I1752 C1753 Q1754 L1755 P1756 L1757 I1758 I1759
I1760 P1761 K1762 I1763 D1764 K1765 F1766 H1767 S1768 L1771 F1772 W1773 L1774 K1775 P1776 S1777 R1778 Q1779 I1780 R1781 P1782 P1783 I1784 Y1785 S1786 L1787 K1788 Q1789 T1790 R1791 L1792 R1793 K1794 R1795 M1796 V1797 K1798 K1799 Y1800 C1801 S1802 L1803 Y1804 F1805 L1806 V1807 L1808 A1809 I1810 F1811 A1812 I1815 I1816 G1817 P1818 A1819 V1820
K1827 H1828 I1829 G1830 D1831 S1832 L1833 D1834 G1835 V1836 V1837 H1838 N1839 L1840 F1841 Q1842 P1843 I1844 N1845 T1846 T1847 N1848 N1849 D1850 T1851 Q1854 M1855 S1856 T1857 Y1858 GLN SER HIS TYR TYR THR HIS THR PRO SER LEU LYS THR TRP SER THR ILE LYS

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	93892	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	1100	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	1.961	Depositor
Minimum map value	-1.330	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.054	Depositor
Recommended contour level	0.229	Depositor
Map size (Å)	278.272, 278.272, 278.272	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.087, 1.087, 1.087	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	0.16	0/1409	0.27	0/1916
2	B	0.15	0/12295	0.32	0/16696
All	All	0.15	0/13704	0.32	0/18612

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	2

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	10	ARG	Sidechain
1	A	11	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	1383	0	1351	9	0
2	B	11977	0	11777	137	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	13360	0	13128	146	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 6.

All (146) 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:B:662:TYR:CD2	2:B:663:TRP:CD1	2.34	1.14
2:B:1590:THR:CB	2:B:1858:TYR:OH	1.95	1.13
2:B:662:TYR:CD2	2:B:663:TRP:HD1	1.67	1.12
2:B:662:TYR:CE2	2:B:663:TRP:CD1	2.44	1.04
2:B:957:PHE:CE2	2:B:1101:ILE:HD13	1.92	1.04
2:B:957:PHE:CE2	2:B:1101:ILE:CD1	2.43	1.01
2:B:1000:PHE:HE1	2:B:1002:VAL:CG2	1.73	1.00
2:B:662:TYR:CE2	2:B:663:TRP:HD1	1.82	0.92
2:B:1000:PHE:CE1	2:B:1002:VAL:HG23	2.07	0.89
2:B:1000:PHE:CE1	2:B:1002:VAL:CG2	2.55	0.89
2:B:1668:ASN:HD22	2:B:1671:ARG:HG3	1.39	0.88
2:B:1657:PHE:HA	2:B:1660:VAL:HG12	1.54	0.86
2:B:1590:THR:CB	2:B:1858:TYR:HH	1.90	0.85
2:B:1653:VAL:CG1	2:B:1657:PHE:CE2	2.63	0.81
1:A:98:GLU:O	1:A:102:GLU:HG3	1.83	0.79
2:B:1668:ASN:ND2	2:B:1671:ARG:HG3	1.97	0.77
2:B:1657:PHE:O	2:B:1660:VAL:HG12	1.86	0.76
2:B:662:TYR:HD2	2:B:663:TRP:CD1	1.97	0.76
2:B:1641:VAL:O	2:B:1645:ILE:HG13	1.87	0.74
2:B:1499:PHE:CZ	2:B:1751:LEU:HD22	2.26	0.71
2:B:1653:VAL:HG12	2:B:1657:PHE:CE2	2.26	0.71
2:B:1657:PHE:CA	2:B:1660:VAL:HG12	2.21	0.70
2:B:948:GLN:N	2:B:948:GLN:OE1	2.25	0.70
2:B:957:PHE:CZ	2:B:1101:ILE:HD13	2.27	0.69
2:B:1596:VAL:CG1	2:B:1601:ARG:HH22	2.07	0.68
2:B:957:PHE:HE2	2:B:1101:ILE:CD1	2.07	0.66
2:B:1183:THR:HB	2:B:1375:VAL:HG21	1.78	0.66
2:B:1653:VAL:CG1	2:B:1657:PHE:HE2	2.06	0.66
2:B:1657:PHE:HA	2:B:1660:VAL:CG1	2.23	0.65
2:B:1596:VAL:CG1	2:B:1601:ARG:NH2	2.59	0.65
2:B:1000:PHE:HE1	2:B:1002:VAL:HG23	1.44	0.64
2:B:1657:PHE:C	2:B:1660:VAL:HG12	2.22	0.63
2:B:1367:TRP:O	2:B:1371:VAL:HG13	2.00	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:588:LEU:HD23	2:B:589:PHE:CE2	2.35	0.61
2:B:957:PHE:HE2	2:B:1101:ILE:HD12	1.63	0.61
2:B:957:PHE:CE2	2:B:1101:ILE:HD12	2.31	0.61
2:B:935:TYR:O	2:B:939:THR:HG23	2.01	0.61
2:B:1653:VAL:HG13	2:B:1657:PHE:CE2	2.35	0.61
2:B:346:GLU:N	2:B:346:GLU:OE1	2.35	0.60
2:B:777:TYR:O	2:B:779:GLN:NE2	2.34	0.60
2:B:1612:VAL:HG11	2:B:1653:VAL:HG21	1.84	0.60
2:B:1608:ALA:HB1	2:B:1657:PHE:CZ	2.38	0.58
2:B:210:HIS:CE1	2:B:214:ILE:HD11	2.40	0.57
2:B:664:TRP:HE1	2:B:668:LEU:HD12	1.70	0.57
2:B:846:THR:HB	2:B:1002:VAL:HG22	1.85	0.57
2:B:1651:VAL:HG22	2:B:1741:ALA:HA	1.85	0.56
2:B:837:ASP:N	2:B:837:ASP:OD1	2.38	0.56
2:B:1664:LEU:HD22	2:B:1840:LEU:HD23	1.87	0.56
2:B:1855:MET:SD	2:B:1855:MET:N	2.79	0.56
2:B:1843:PRO:HB2	2:B:1846:THR:CG2	2.36	0.55
2:B:234:ASP:OD1	2:B:235:GLU:N	2.39	0.55
2:B:662:TYR:CE2	2:B:663:TRP:NE1	2.73	0.55
2:B:662:TYR:HE2	2:B:663:TRP:CD1	2.17	0.54
2:B:1668:ASN:HD22	2:B:1671:ARG:CG	2.15	0.54
1:A:98:GLU:HG2	1:A:102:GLU:OE2	2.08	0.54
2:B:1657:PHE:O	2:B:1660:VAL:CG1	2.53	0.54
2:B:1294:HIS:HB2	2:B:1295:PRO:HD3	1.90	0.54
2:B:300:GLU:O	2:B:304:HIS:ND1	2.41	0.54
2:B:1858:TYR:O	2:B:1858:TYR:CG	2.60	0.54
2:B:1128:GLU:N	2:B:1128:GLU:OE1	2.38	0.54
2:B:1843:PRO:HB2	2:B:1846:THR:HG23	1.90	0.53
2:B:761:MET:HE1	2:B:818:ARG:HE	1.72	0.53
2:B:1495:ALA:HB3	2:B:1498:ASP:HB3	1.91	0.52
2:B:1503:TYR:CD1	2:B:1751:LEU:HD13	2.44	0.52
2:B:663:TRP:HB2	2:B:664:TRP:CE3	2.45	0.52
2:B:1341:VAL:HB	2:B:1342:PRO:HD3	1.92	0.52
2:B:657:ARG:O	2:B:1586:THR:HA	2.12	0.50
2:B:664:TRP:HB2	2:B:667:VAL:HG22	1.94	0.49
2:B:1596:VAL:HG11	2:B:1601:ARG:HH22	1.78	0.49
2:B:662:TYR:HE2	2:B:663:TRP:NE1	2.10	0.49
2:B:657:ARG:O	2:B:1586:THR:O	2.29	0.49
2:B:1590:THR:N	2:B:1858:TYR:OH	2.46	0.49
2:B:745:LYS:O	2:B:748:VAL:HG12	2.13	0.49
2:B:1503:TYR:CD1	2:B:1751:LEU:CD1	2.96	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:1448:SER:O	2:B:1449:ALA:HB3	2.12	0.49
2:B:1727:SER:O	2:B:1731:THR:HG23	2.12	0.49
2:B:1649:VAL:O	2:B:1653:VAL:HG23	2.13	0.48
2:B:545:PRO:O	2:B:549:VAL:HG23	2.14	0.48
2:B:553:ASP:OD1	2:B:554:LYS:N	2.47	0.48
2:B:1664:LEU:CD2	2:B:1840:LEU:HD23	2.45	0.47
2:B:1733:LYS:O	2:B:1737:LEU:HG	2.14	0.47
2:B:236:ILE:HD13	2:B:605:THR:HG22	1.96	0.47
2:B:185:MET:HE3	2:B:313:GLY:HA3	1.97	0.47
2:B:527:HIS:CD2	2:B:593:MET:HE1	2.50	0.47
2:B:232:MET:HE3	2:B:282:LEU:HA	1.97	0.47
2:B:1673:LEU:O	2:B:1676:VAL:HG12	2.16	0.46
2:B:1000:PHE:HE1	2:B:1002:VAL:HG21	1.68	0.46
2:B:664:TRP:HB2	2:B:667:VAL:CG2	2.45	0.46
2:B:1371:VAL:O	2:B:1375:VAL:HG23	2.16	0.46
2:B:1845:ASN:C	2:B:1846:THR:HG23	2.41	0.46
1:A:29:VAL:HG11	1:A:166:ALA:O	2.16	0.46
2:B:692:THR:HG21	2:B:1292:TYR:OH	2.15	0.46
2:B:1665:GLU:HG3	2:B:1672:MET:CA	2.46	0.45
1:A:75:ARG:N	1:A:76:PRO:HD2	2.32	0.45
2:B:1595:ARG:O	2:B:1837:VAL:HG23	2.16	0.45
2:B:1371:VAL:N	2:B:1372:PRO:HD2	2.32	0.45
2:B:1659:ILE:O	2:B:1663:VAL:HG23	2.17	0.45
1:A:9:ILE:HB	1:A:11:ARG:HH11	1.81	0.44
2:B:830:ILE:HG22	2:B:1241:TYR:CD1	2.53	0.44
2:B:185:MET:HE1	2:B:312:TRP:CZ3	2.52	0.44
2:B:185:MET:HE1	2:B:312:TRP:HZ3	1.82	0.44
2:B:1858:TYR:O	2:B:1858:TYR:CD2	2.70	0.44
1:A:178:ALA:O	1:A:182:ALA:N	2.50	0.44
2:B:462:ILE:HG21	2:B:633:TYR:CE1	2.53	0.43
2:B:664:TRP:CD1	2:B:664:TRP:O	2.71	0.43
1:A:84:VAL:HG23	1:A:118:ILE:HB	2.00	0.43
2:B:1371:VAL:HG22	2:B:1372:PRO:HD3	2.00	0.43
2:B:1641:VAL:O	2:B:1645:ILE:CG1	2.64	0.43
2:B:690:LEU:HD23	2:B:1365:VAL:HG11	2.01	0.43
2:B:217:ASP:OD2	2:B:1142:GLN:NE2	2.49	0.43
2:B:1653:VAL:HG12	2:B:1657:PHE:CD2	2.54	0.43
2:B:185:MET:HE3	2:B:313:GLY:CA	2.49	0.43
2:B:590:THR:HA	2:B:593:MET:HE3	2.00	0.43
2:B:1522:TRP:CZ2	2:B:1526:VAL:HG11	2.54	0.42
2:B:527:HIS:HD2	2:B:593:MET:HE1	1.85	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:785:GLU:N	2:B:785:GLU:OE1	2.52	0.42
2:B:657:ARG:HD2	2:B:1858:TYR:CD1	2.54	0.42
2:B:1725:GLN:N	2:B:1726:PRO:HD2	2.34	0.42
1:A:75:ARG:N	1:A:76:PRO:CD	2.83	0.42
2:B:1329:ILE:HG22	2:B:1330:TYR:N	2.34	0.42
2:B:1349:GLN:O	2:B:1352:VAL:HG22	2.20	0.42
2:B:1495:ALA:HB3	2:B:1498:ASP:CB	2.49	0.42
2:B:1608:ALA:HB1	2:B:1657:PHE:CE1	2.55	0.42
2:B:774:LYS:N	2:B:774:LYS:HD2	2.35	0.42
2:B:1093:TYR:CD1	2:B:1093:TYR:C	2.98	0.42
2:B:1499:PHE:CG	2:B:1758:ILE:HD11	2.54	0.42
2:B:1817:GLY:N	2:B:1818:PRO:HD2	2.35	0.42
1:A:9:ILE:HD11	1:A:183:SER:HB2	2.02	0.41
2:B:954:ILE:HD12	2:B:1028:LEU:HD11	2.02	0.41
2:B:1596:VAL:HG13	2:B:1601:ARG:NH2	2.35	0.41
2:B:1757:LEU:HD23	2:B:1757:LEU:C	2.45	0.41
2:B:1560:LEU:O	2:B:1563:ALA:HB3	2.20	0.41
2:B:1340:LEU:HD22	2:B:1340:LEU:H	1.85	0.41
2:B:164:ILE:O	2:B:167:ILE:HG22	2.20	0.41
2:B:1294:HIS:HB2	2:B:1295:PRO:CD	2.50	0.41
2:B:1662:TRP:CD1	2:B:1667:PHE:HA	2.55	0.41
2:B:641:VAL:HG13	2:B:642:LEU:N	2.35	0.41
2:B:661:GLU:O	2:B:665:GLY:CA	2.69	0.41
2:B:1334:LYS:HG2	2:B:1335:PRO:HD2	2.02	0.41
2:B:1516:GLN:O	2:B:1518:HIS:CD2	2.74	0.41
2:B:1438:PHE:CD1	2:B:1438:PHE:C	2.99	0.41
2:B:1669:PHE:CE2	2:B:1673:LEU:HD11	2.55	0.41
2:B:1503:TYR:HD1	2:B:1751:LEU:CD1	2.34	0.40
2:B:1672:MET:C	2:B:1672:MET:SD	3.05	0.40
2:B:580:PHE:HE1	2:B:588:LEU:HD21	1.86	0.40
2:B:1690:MET:O	2:B:1694:MET:HG2	2.21	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	176/209 (84%)	171 (97%)	5 (3%)	0	100	100
2	B	1466/1876 (78%)	1437 (98%)	29 (2%)	0	100	100
All	All	1642/2085 (79%)	1608 (98%)	34 (2%)	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	151/180 (84%)	148 (98%)	3 (2%)	50	70
2	B	1264/1620 (78%)	1257 (99%)	7 (1%)	84	90
All	All	1415/1800 (79%)	1405 (99%)	10 (1%)	80	88

All (10) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	9	ILE
1	A	10	ARG
1	A	11	ARG
2	B	658	CYS
2	B	1010	PHE
2	B	1110	GLU
2	B	1328	CYS
2	B	1346	TYR
2	B	1467	HIS
2	B	1658	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
2	B	385	ASN
2	B	604	GLN
2	B	1013	HIS
2	B	1347	ASN
2	B	1518	HIS
2	B	1668	ASN
2	B	1748	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

There are no chain breaks in this entry.

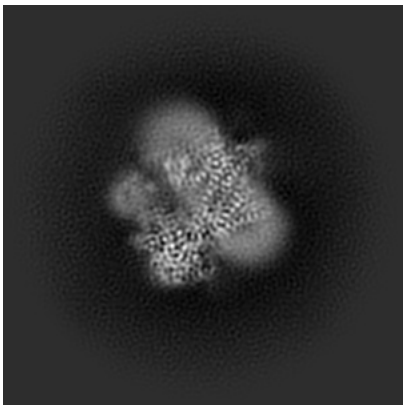
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-37614. These allow visual inspection of the internal detail of the map and identification of artifacts.

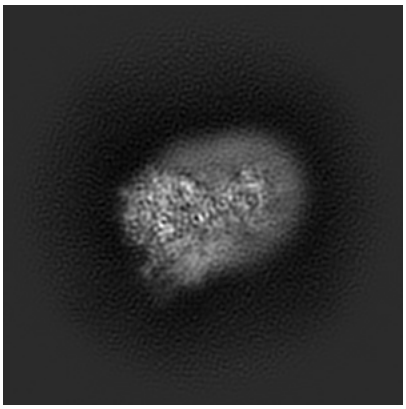
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

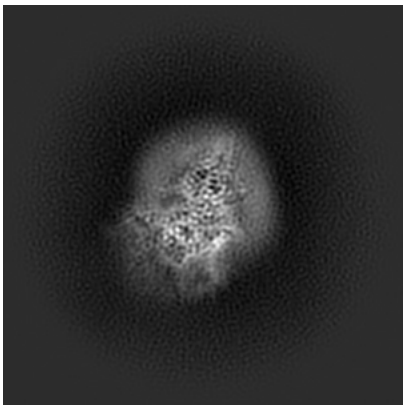
6.1.1 Primary map



X

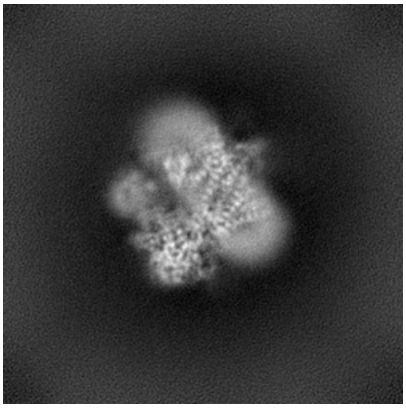


Y

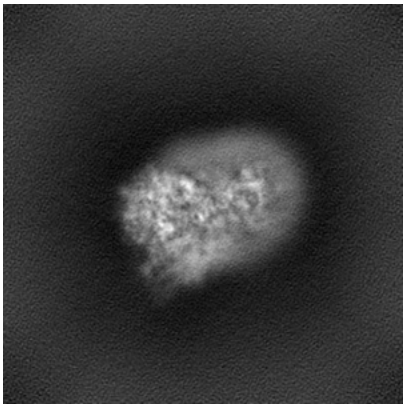


Z

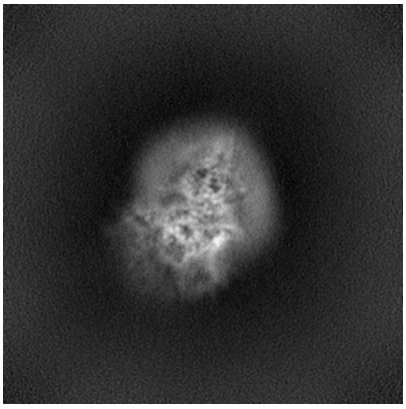
6.1.2 Raw map



X



Y

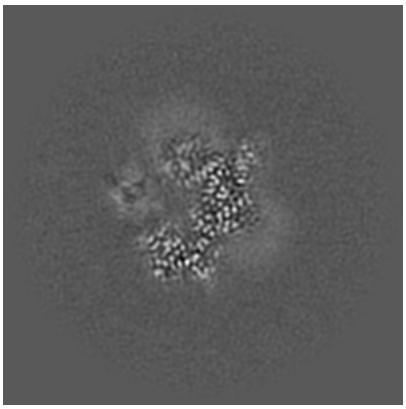


Z

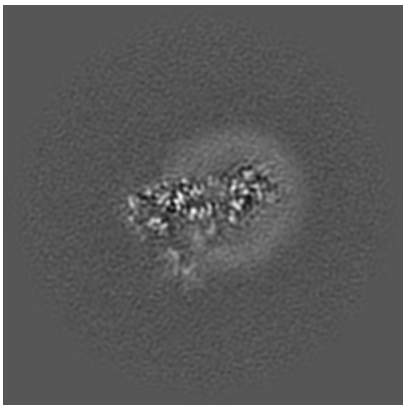
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

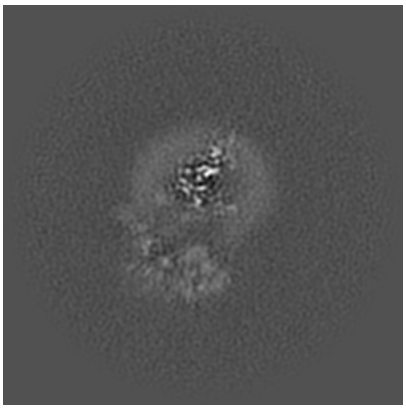
6.2.1 Primary map



X Index: 128

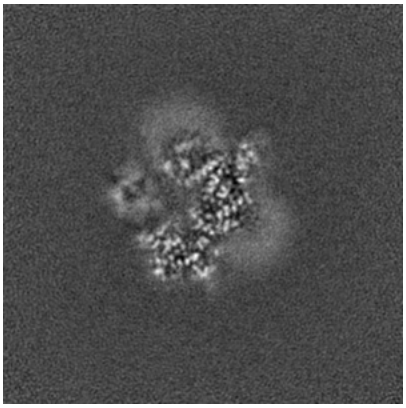


Y Index: 128

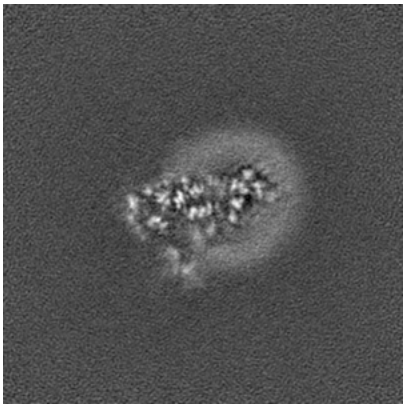


Z Index: 128

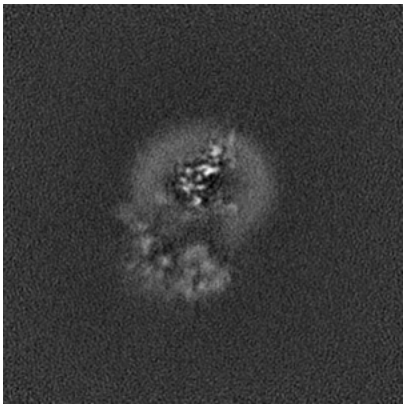
6.2.2 Raw map



X Index: 128



Y Index: 128

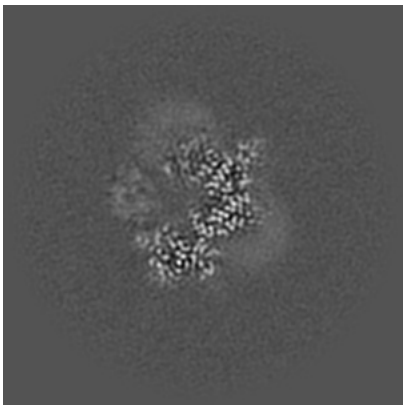


Z Index: 128

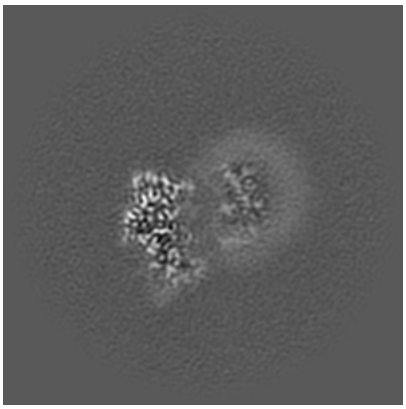
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

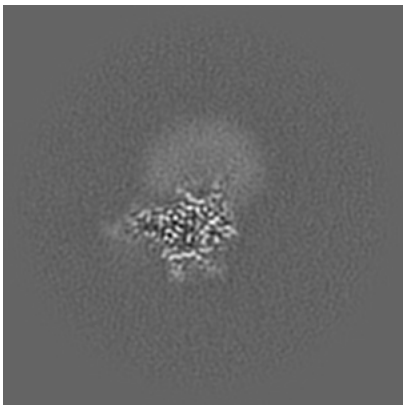
6.3.1 Primary map



X Index: 130

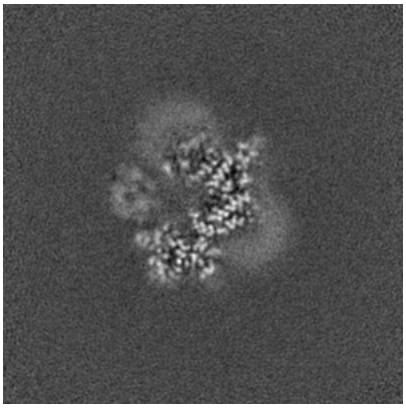


Y Index: 113

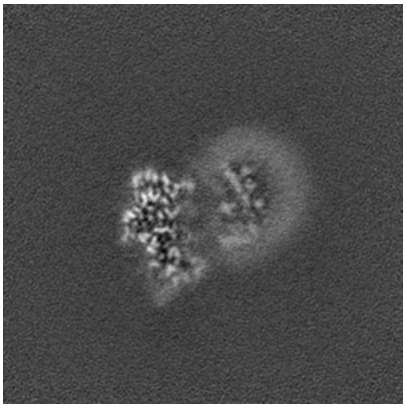


Z Index: 103

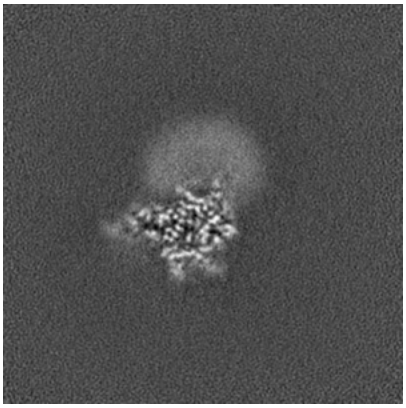
6.3.2 Raw map



X Index: 130



Y Index: 113

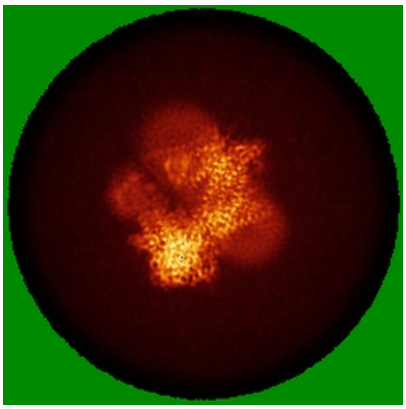


Z Index: 103

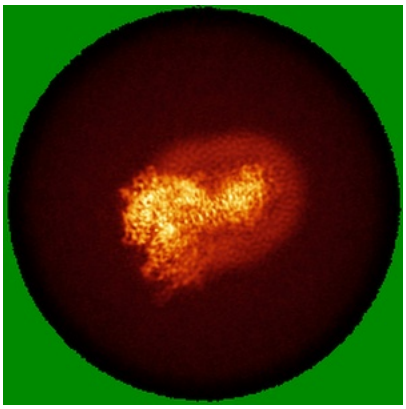
The images above show the largest variance slices of the map in three orthogonal directions.

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

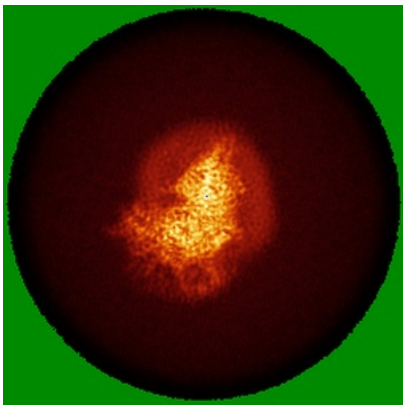
6.4.1 Primary map



X

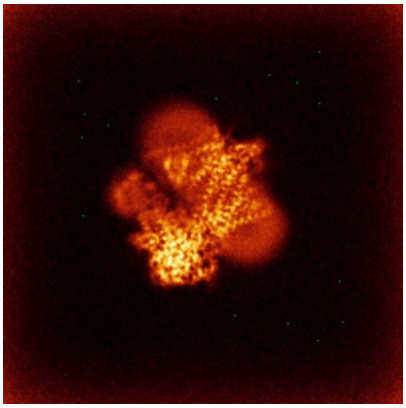


Y



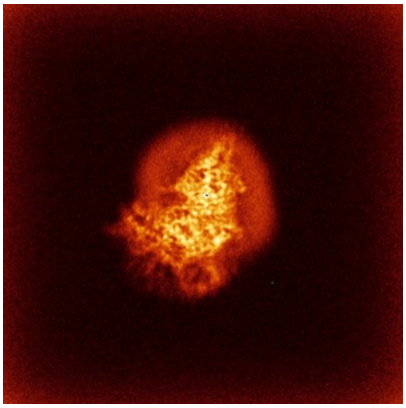
Z

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.

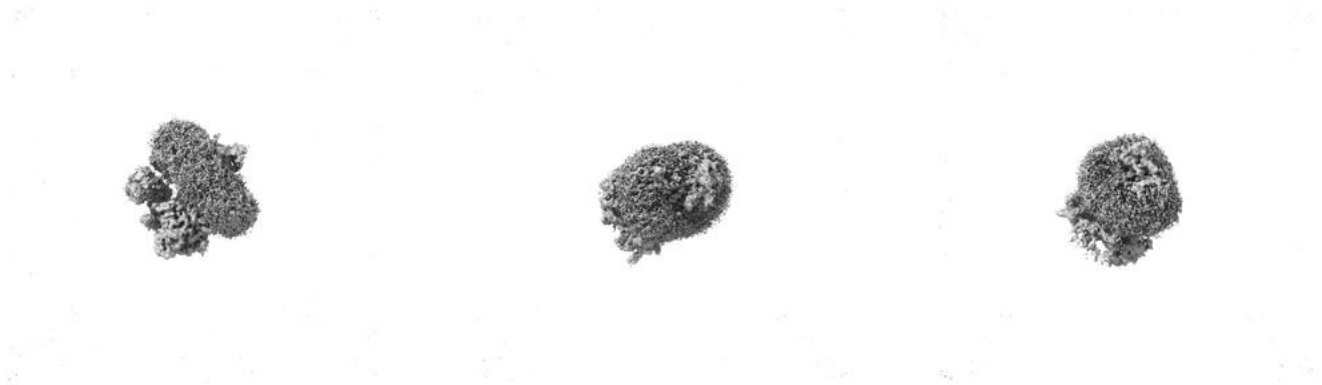
6.5 Orthogonal surface views (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.229. 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.

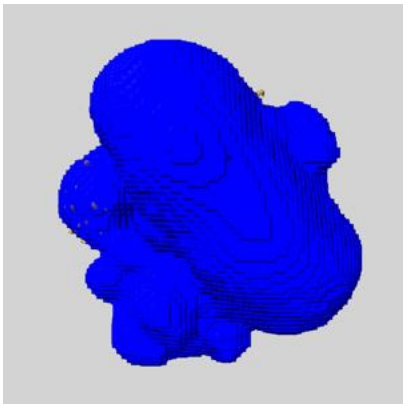
6.6 Mask visualisation (i)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

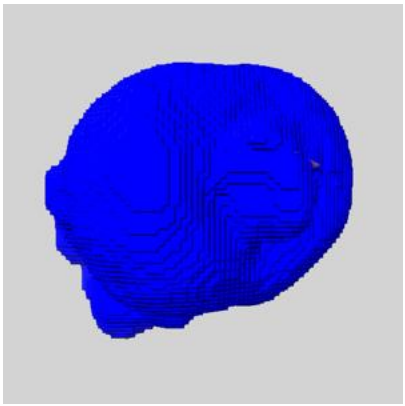
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

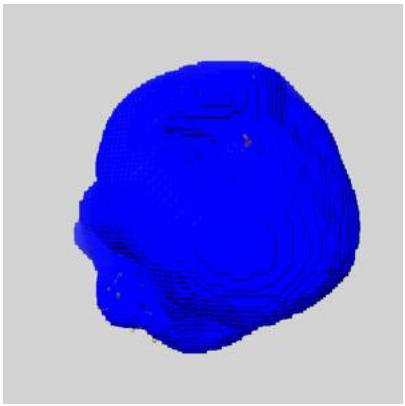
6.6.1 emd_37614_msk_1.map (i)



X



Y

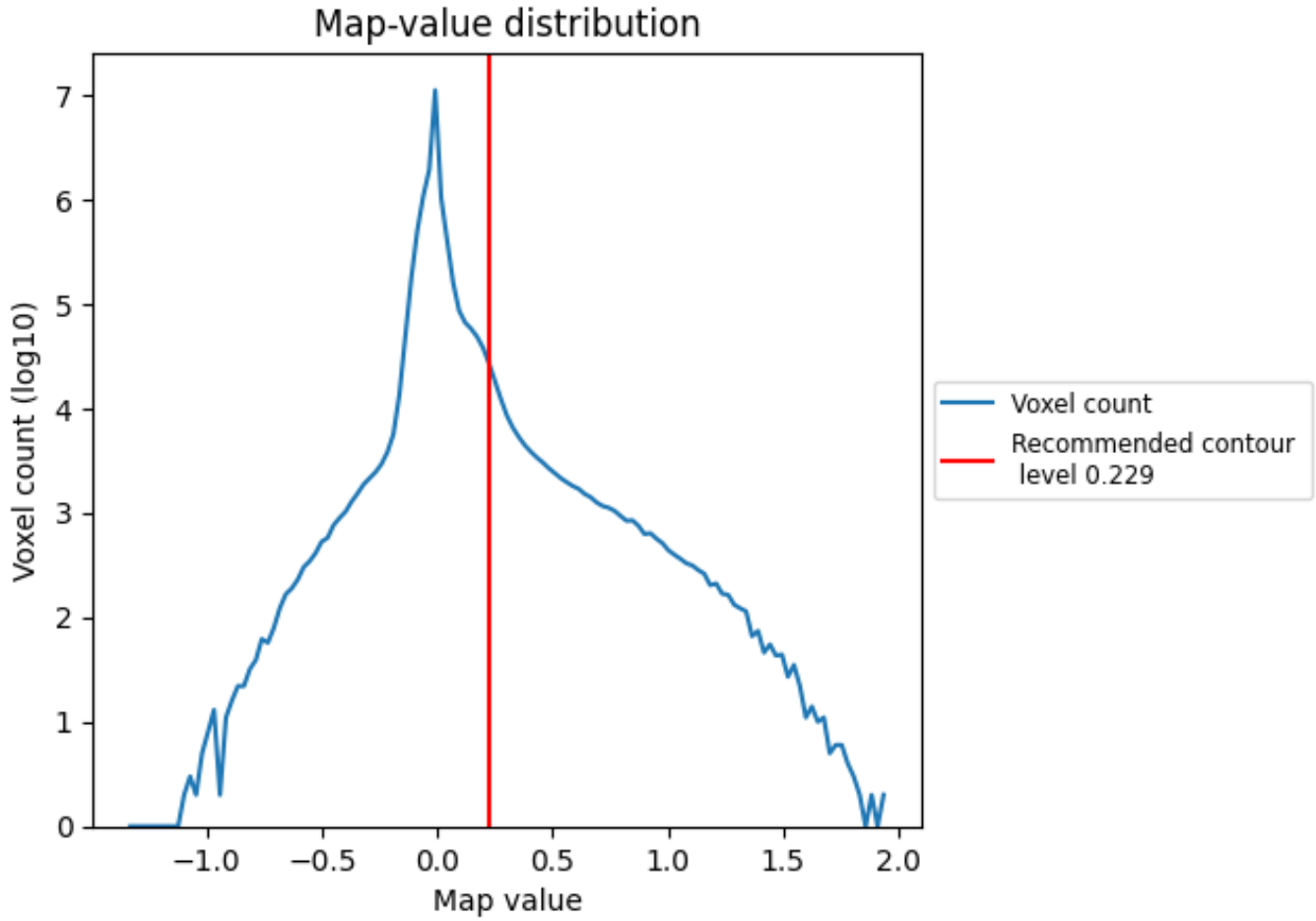


Z

7 Map analysis

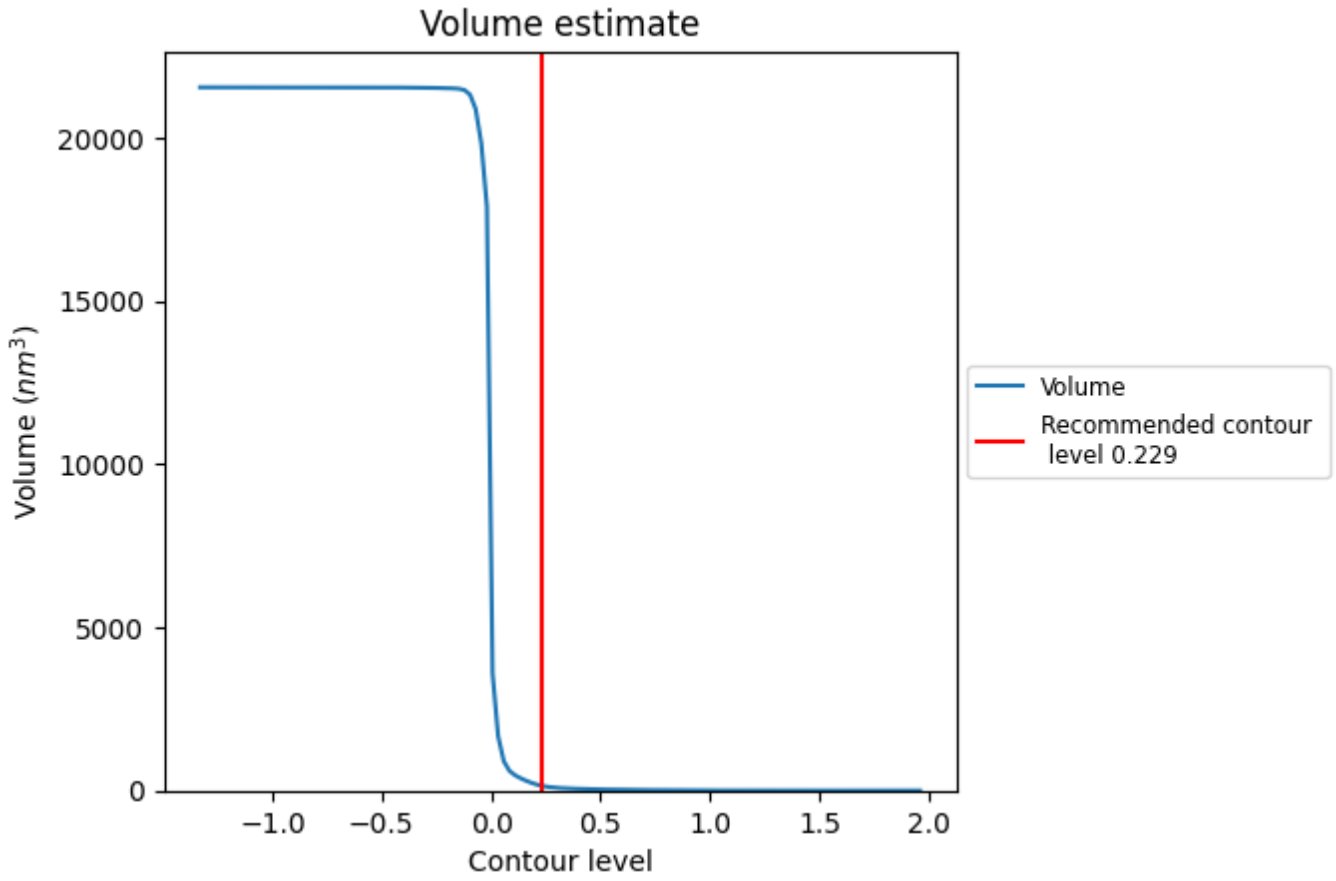
This section contains the results of statistical analysis of the map.

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.

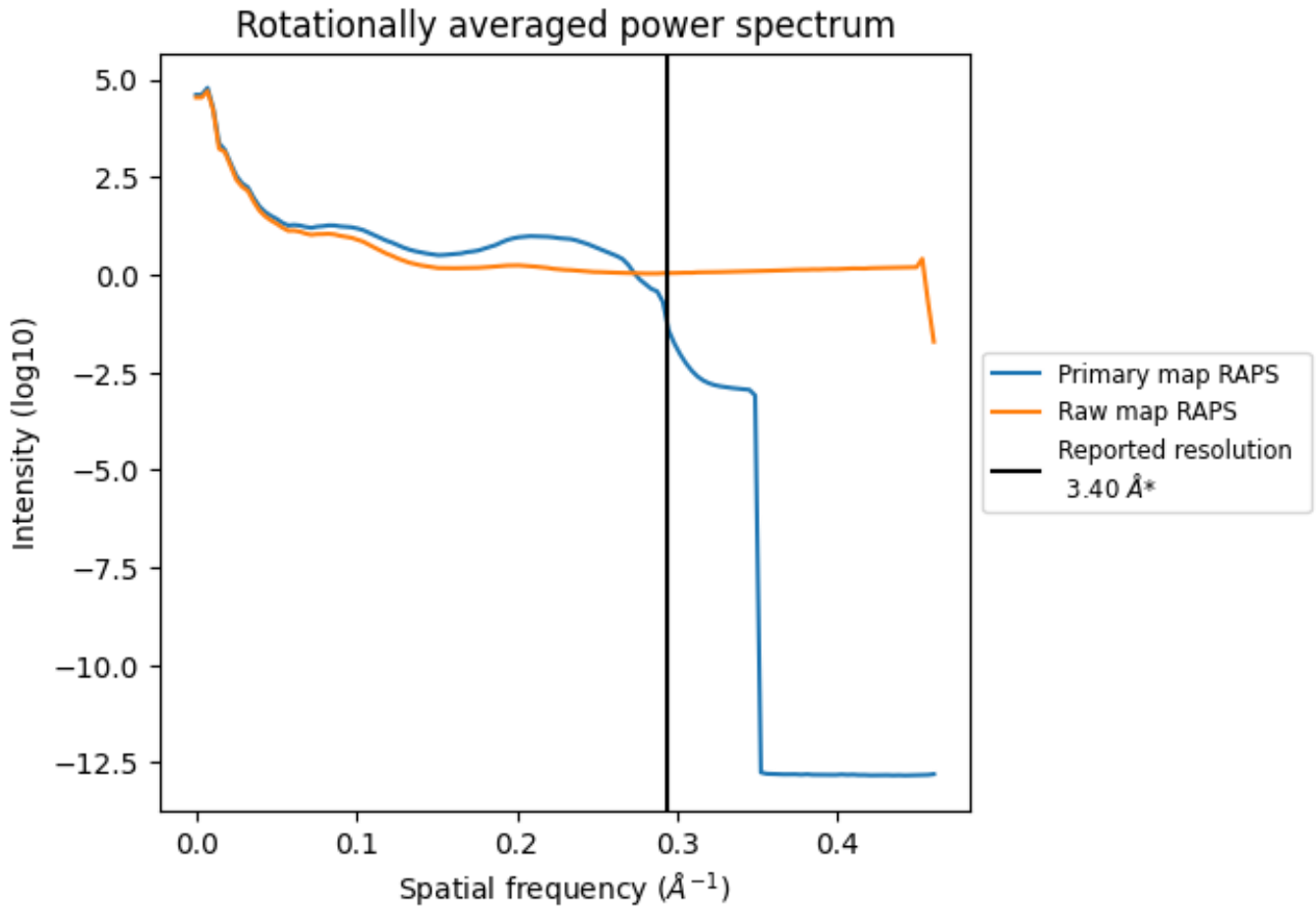
7.2 Volume estimate



The volume at the recommended contour level is 152 nm^3; this corresponds to an approximate mass of 137 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)

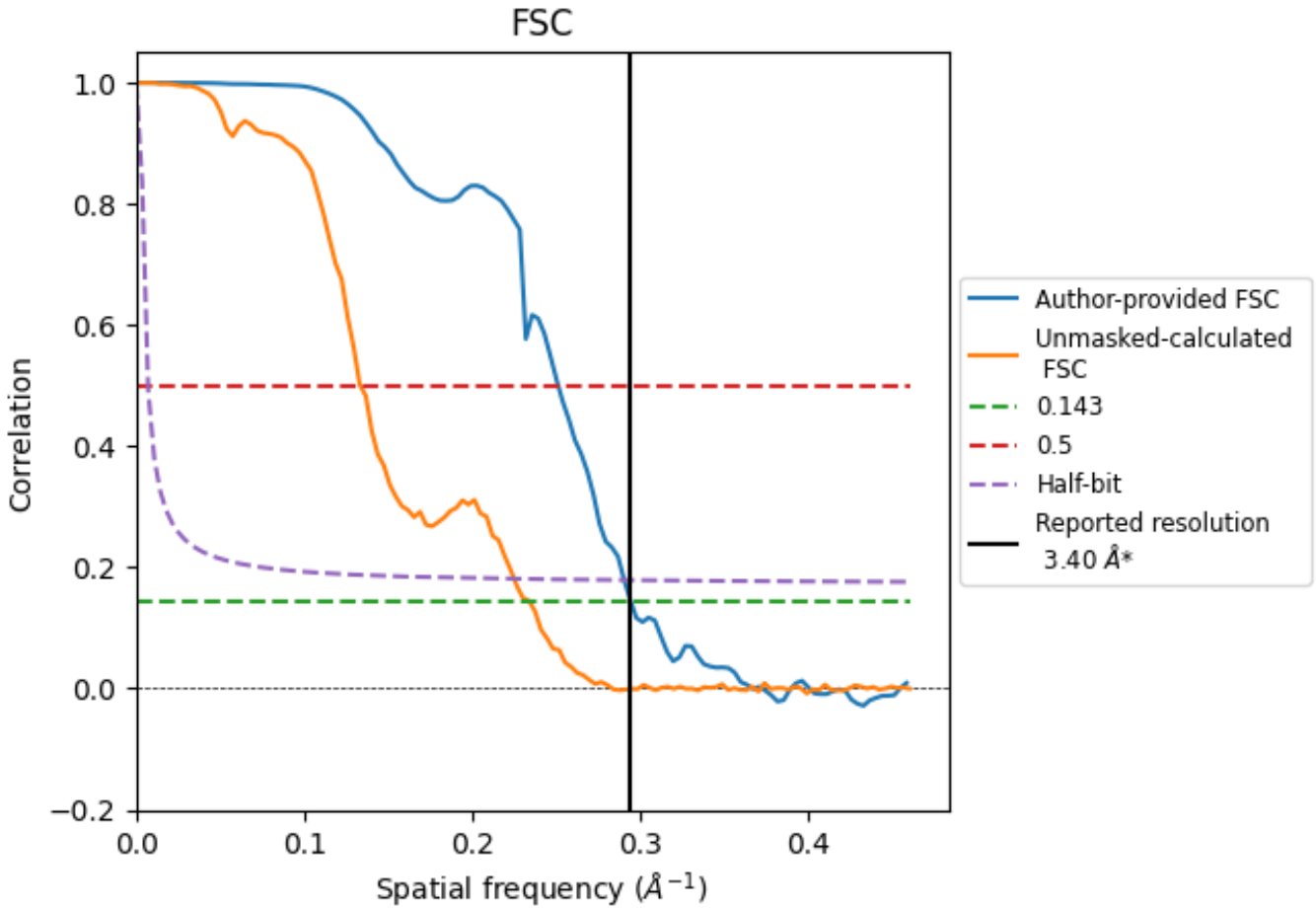


*Reported resolution corresponds to spatial frequency of 0.294 $Å^{-1}$

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 0.294 Å^{-1}

8.2 Resolution estimates (i)

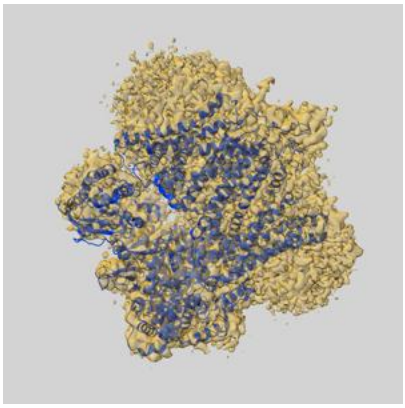
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.40	-	-
Author-provided FSC curve	3.40	3.98	3.44
Unmasked-calculated*	4.27	7.50	4.45

*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 4.27 differs from the reported value 3.4 by more than 10 %

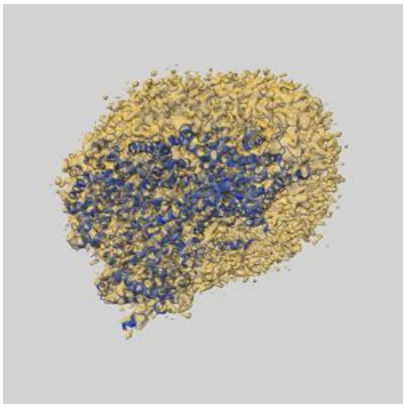
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-37614 and PDB model 8WLA. Per-residue inclusion information can be found in section 3 on page 4.

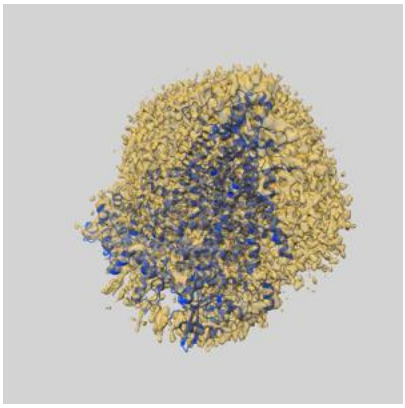
9.1 Map-model overlay



X



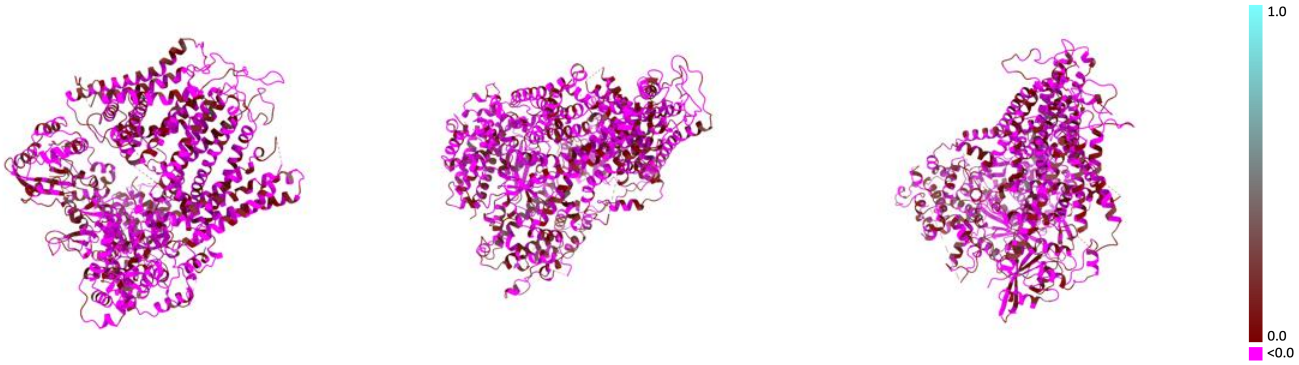
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.229 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.

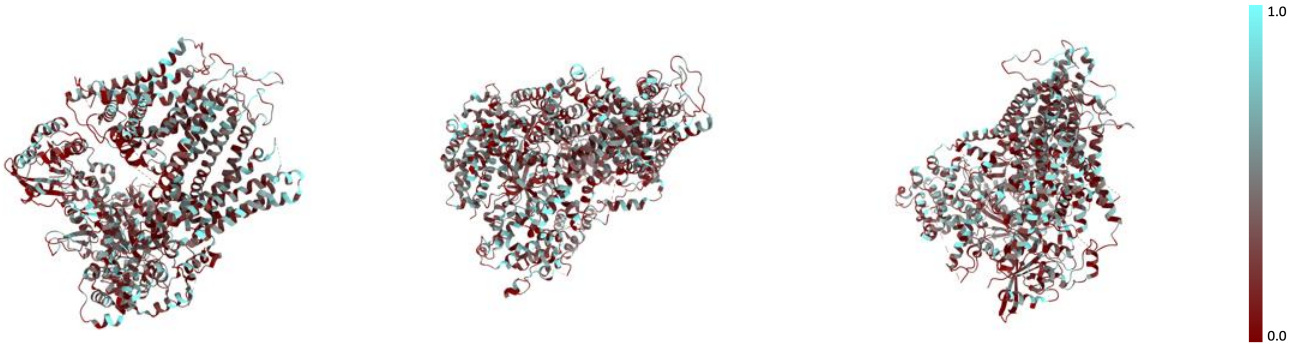
9.2 Q-score mapped to coordinate model (i)



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.

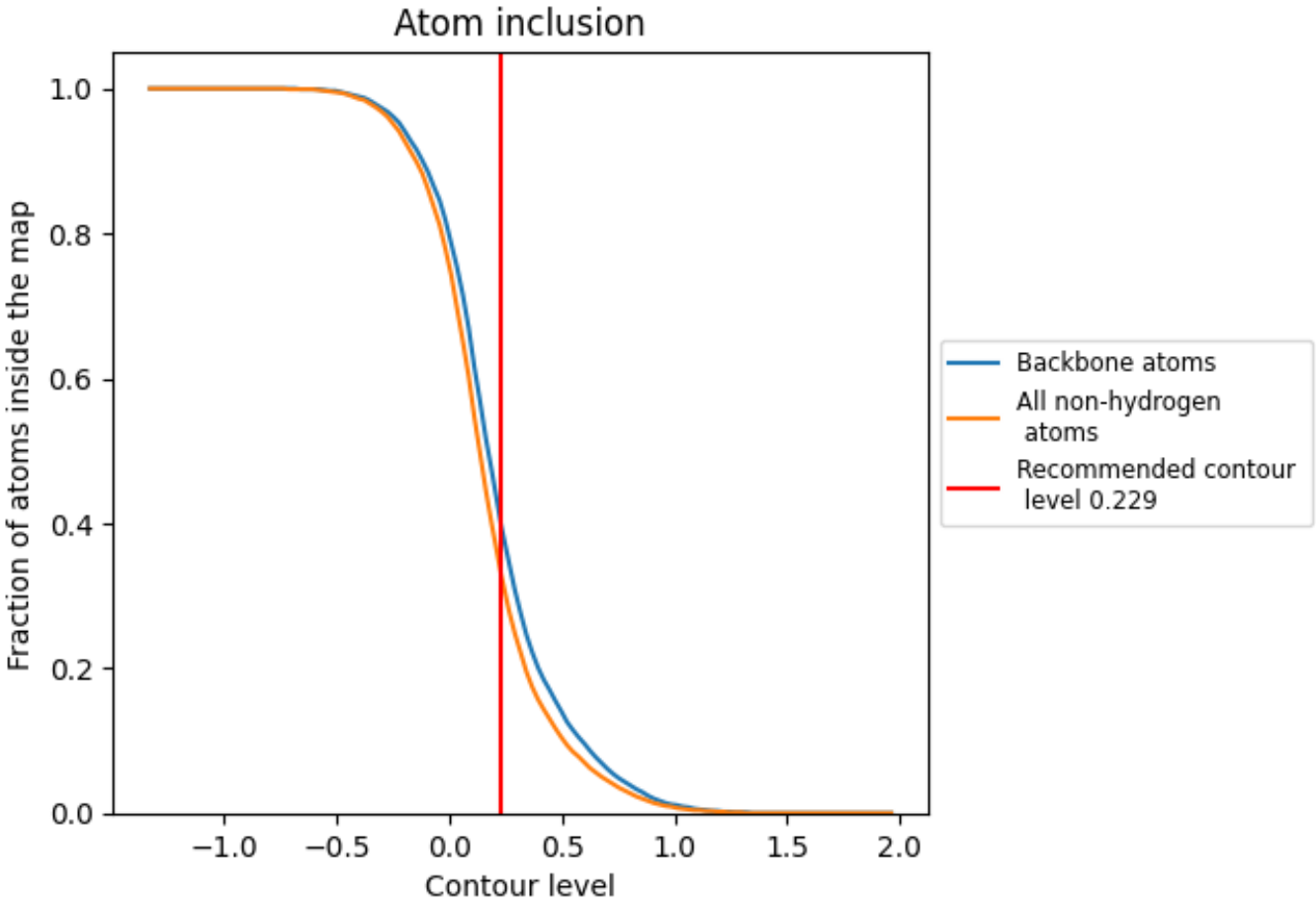
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.229).

9.4 Atom inclusion (i)



At the recommended contour level, 40% of all backbone atoms, 33% 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 (0.229) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.3290	-0.0500
A	0.2520	-0.0100
B	0.3380	-0.0540