Full wwPDB EM Validation Report ⓘ

Mar 23, 2026 – 07:01 PM JST

PDB ID	:	9JN2 / pdb_00009jn2
EMDB ID	:	EMD-61619
Title	:	Multidrug resistance-associated protein 2 in complex with AMP-PNP in active state
Authors	:	Chen, D.D.; Zhao, P.
Deposited on	:	2024-09-22
Resolution	:	3.44 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:

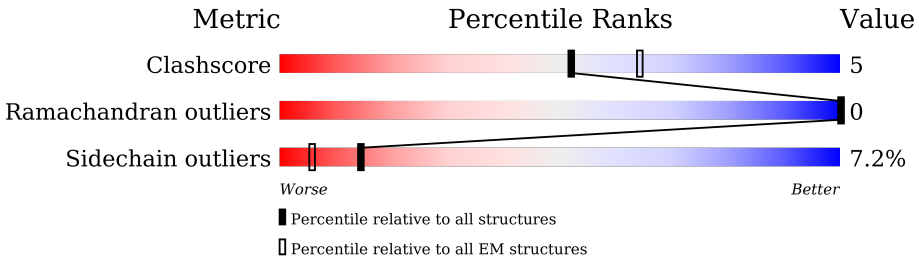
EMDB validation analysis	:	0.0.1.dev132
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive 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)	:	2.48.1

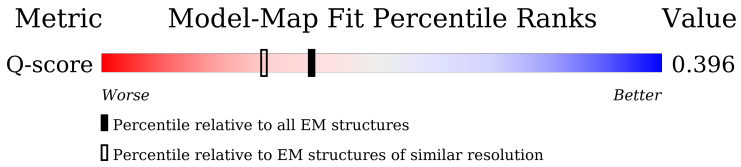
1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.44 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	13877 (2.94 - 3.94)

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	1545	

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 11156 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.

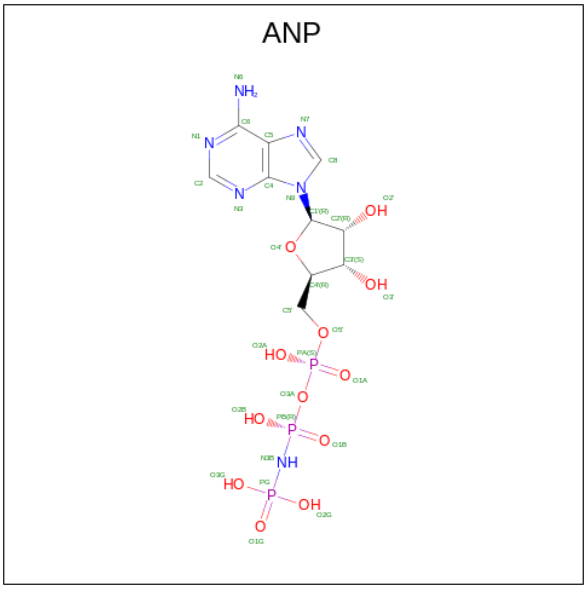
- Molecule 1 is a protein called ATP-binding cassette sub-family C member 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	1400	11123	7219	1842	2005	57	0	0

- Molecule 2 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
2	A	2	2	2	0

- Molecule 3 is PHOSPHOAMINOPHOSPHONIC ACID-ADENYLATE ESTER (CCD ID: ANP) (formula: $C_{10}H_{17}N_6O_{12}P_3$) (labeled as "Ligand of Interest" by depositor).



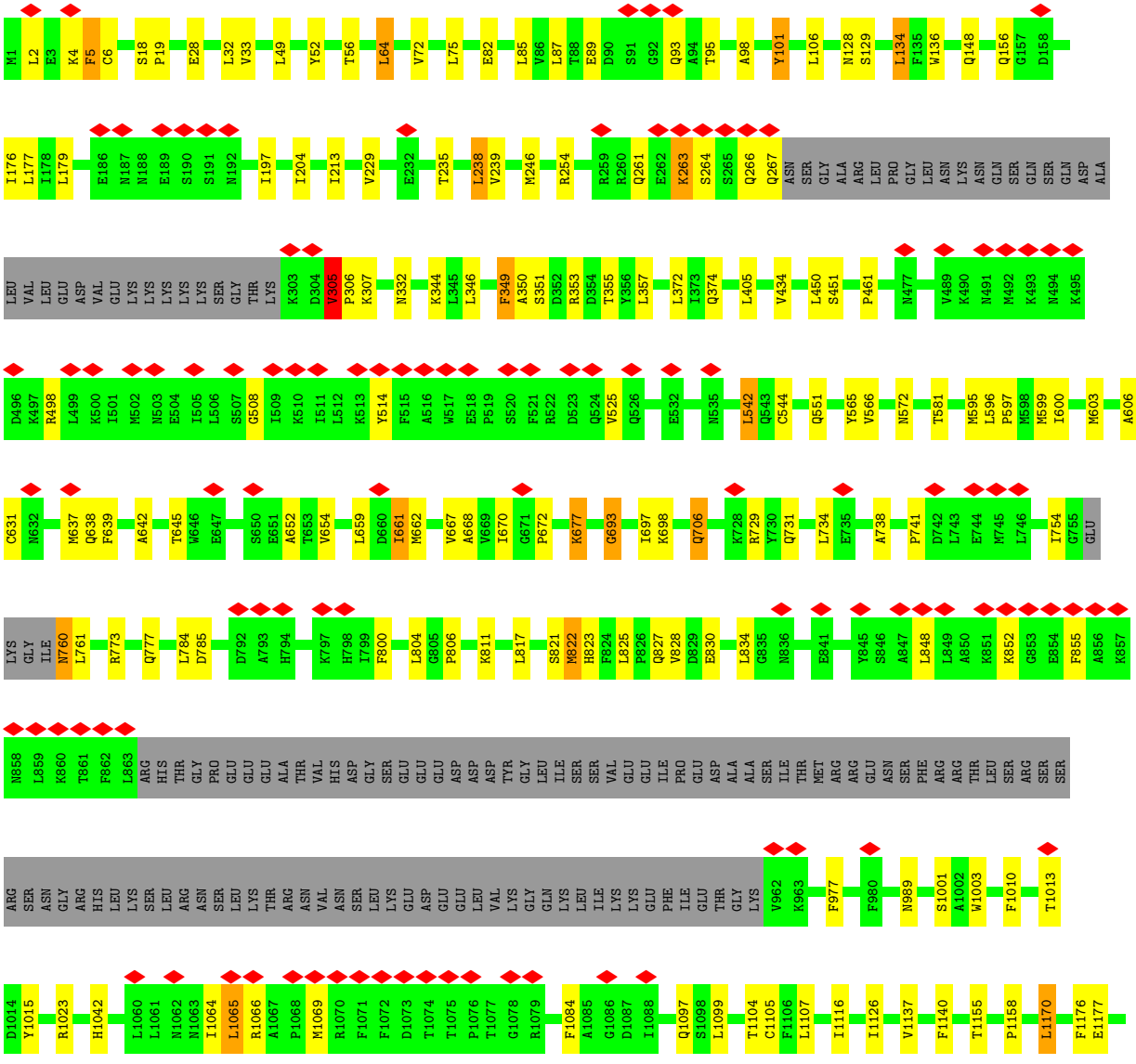
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
3	A	1	31	10	6	12	3	0

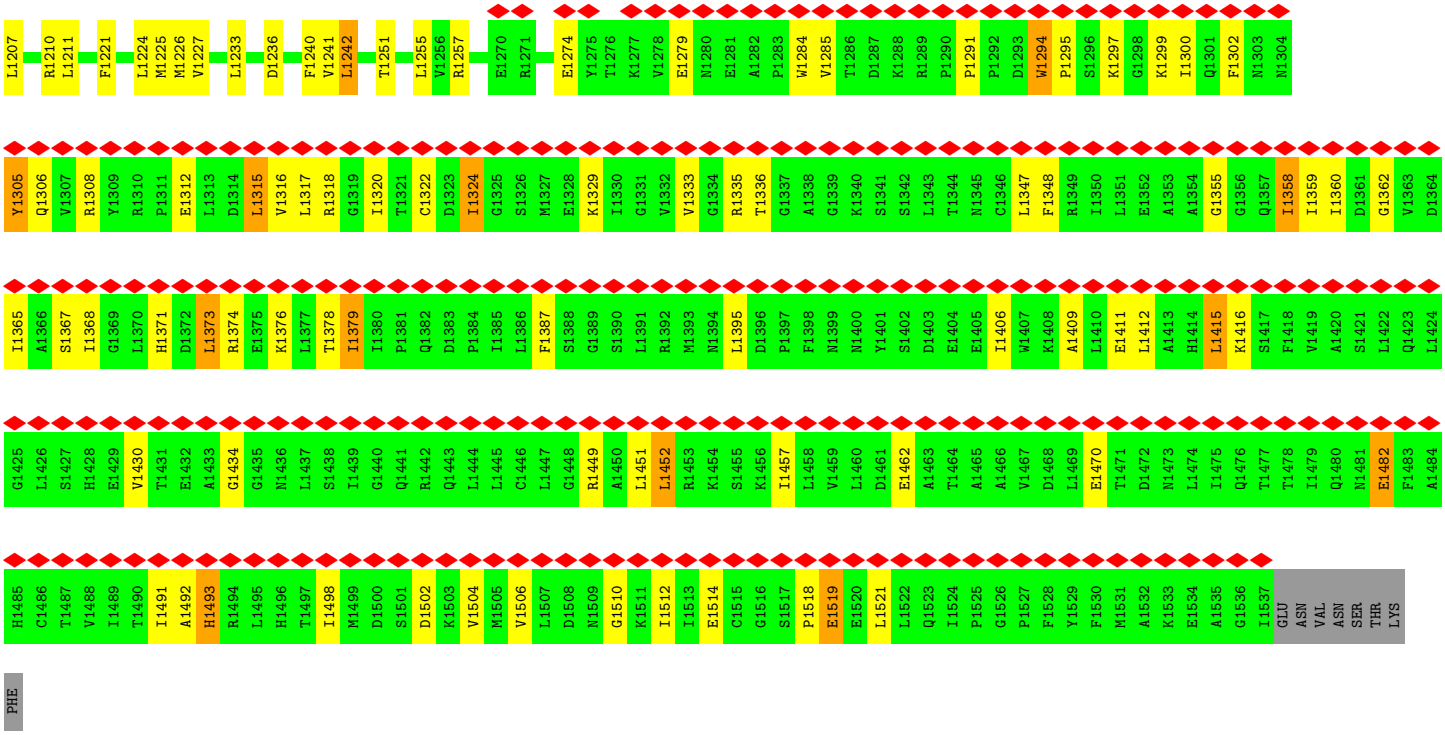
3 Residue-property plots (i)

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: ATP-binding cassette sub-family C member 2

Chain A:




L1207 R1210 L1211 F1221 L1224 M1225 M1226 V1227 L1233 D1236 F1240 V1241 L1242 T1251 L1255 V1256 R1257 E1270 R1271 E1274 Y1275 T1276 K1277 V1278 E1279 N1280 E1281 A1282 P1283 W1284 V1285 T1286 D1287 K1288 R1289 P1290 P1291 P1292 D1293 W1294 P1295 S1296 K1297 G1298 K1299 I1300 Q1301 F1302 N1303 N1304
Y1305 Q1306 V1307 R1308 Y1309 R1310 P1311 E1312 L1313 D1314 L1315 V1316 L1317 R1318 G1319 I1320 T1321 C1322 D1323 I1324 G1325 S1326 M1327 E1328 K1329 I1330 G1331 V1332 V1333 G1334 R1335 T1336 G1337 A1338 G1339 K1340 S1341 S1342 L1343 T1344 N1345 C1346 L1347 F1348 R1349 I1350 L1351 E1352 A1353 A1354 G1355 G1356 Q1357 I1358 I1359 I1360 D1361 G1362 V1363 D1364
I1365 A1366 S1367 I1368 G1369 L1370 H1371 D1372 L1373 R1374 E1375 K1376 L1377 T1378 I1379 I1380 P1381 Q1382 D1383 P1384 I1385 L1386 F1387 S1388 G1389 S1390 L1391 R1392 M1393 N1394 L1395 D1396 P1397 F1398 N1399 N1400 Y1401 S1402 D1403 E1404 E1405 I1406 W1407 K1408 A1409 L1410 E1411 L1412 A1413 H1414 L1415 K1416 S1417 F1418 V1419 A1420 S1421 L1422 Q1423 L1424
G1425 L1426 S1427 H1428 E1429 V1430 T1431 E1432 A1433 G1434 G1435 N1436 L1437 S1438 I1439 G1440 Q1441 R1442 Q1443 L1444 L1445 C1446 L1447 G1448 R1449 A1450 L1451 L1452 R1453 K1454 S1455 K1456 I1457 L1458 V1459 L1460 D1461 E1462 A1463 T1464 A1465 A1466 V1467 D1468 L1469 E1470 T1471 D1472 N1473 L1474 I1475 Q1476 T1477 T1478 I1479 Q1480 N1481 E1482 F1483 A1484
H1485 C1486 T1487 V1488 I1489 T1490 I1491 A1492 H1493 R1494 L1495 H1496 T1497 I1498 M1499 D1500 S1501 D1502 K1503 V1504 M1505 V1506 L1507 D1508 N1509 G1510 K1511 I1512 I1513 E1514 C1515 G1516 S1517 P1518 E1519 E1520 L1521 L1522 Q1523 I1524 P1525 G1526 P1527 F1528 Y1529 F1530 M1531 A1532 K1533 E1534 A1535 G1536 I1537 GLU ASN VAL ASN SER THR LYS
PHE

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	111169	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TECNAI F30	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	1.354	Depositor
Minimum map value	-0.957	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.033	Depositor
Recommended contour level	0.14	Depositor
Map size (Å)	256.80002, 256.80002, 256.80002	wwPDB
Map dimensions	240, 240, 240	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.07, 1.07, 1.07	Depositor

5 Model quality

5.1 Standard geometry

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

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	0.92	0/11358	1.26	16/15400 (0.1%)

There are no bond length outliers.

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	1010	PHE	CB-CA-C	-7.48	98.59	111.45
1	A	351	SER	N-CA-C	-6.76	105.16	113.41
1	A	1176	PHE	CA-CB-CG	6.59	120.39	113.80
1	A	693	GLY	CA-C-O	-6.53	117.72	122.23
1	A	106	LEU	N-CA-C	-5.87	104.88	111.28
1	A	349	PHE	N-CA-C	-5.77	102.92	110.53
1	A	1491	ILE	CA-C-O	-5.73	117.65	122.63
1	A	305	VAL	N-CA-C	-5.45	101.79	107.84
1	A	1069	MET	N-CA-C	-5.43	105.47	111.71
1	A	75	LEU	N-CA-C	-5.41	105.38	111.28
1	A	461	PRO	CB-CA-C	-5.40	104.18	111.85
1	A	72	VAL	N-CA-C	-5.23	104.52	111.05
1	A	1176	PHE	CB-CA-C	-5.12	101.89	110.19
1	A	134	LEU	N-CA-C	-5.08	107.75	114.31
1	A	101	TYR	CB-CA-C	-5.05	102.30	110.79
1	A	1240	PHE	CB-CA-C	5.03	119.41	110.85

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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	11123	0	11383	116	0
2	A	2	0	0	0	0
3	A	31	0	13	1	0
All	All	11156	0	11396	117	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 5.

All (117) 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:434:VAL:HG21	1:A:606:ALA:HB2	1.57	0.85
1:A:1305:TYR:HA	1:A:1355:GLY:HA3	1.69	0.74
1:A:544:CYS:HB3	1:A:1042:HIS:HB3	1.71	0.72
1:A:637:MET:HE3	1:A:661:ILE:HG13	1.71	0.71
1:A:254:ARG:HG3	1:A:306:PRO:HG3	1.73	0.70
1:A:645:THR:HB	1:A:652:ALA:HA	1.77	0.66
1:A:1333:VAL:HG22	1:A:1498:ILE:HG13	1.79	0.65
1:A:706:GLN:HG2	1:A:785:ASP:OD2	1.98	0.64
1:A:1335:ARG:HB2	1:A:1493:HIS:HB2	1.81	0.61
1:A:754:ILE:HA	1:A:760:ASN:HD21	1.64	0.61
1:A:852:LYS:HA	1:A:855:PHE:HB3	1.84	0.60
1:A:1295:PRO:HA	1:A:1457:ILE:HD11	1.85	0.58
1:A:1295:PRO:HD3	1:A:1376:LYS:HD2	1.84	0.58
1:A:1360:ILE:HG12	1:A:1368:ILE:HD11	1.85	0.57
1:A:1284:TRP:HB3	1:A:1371:HIS:CG	2.40	0.56
1:A:1291:PRO:HD3	1:A:1360:ILE:HG21	1.87	0.56
1:A:263:LYS:O	1:A:267:GLN:HG3	2.07	0.55
1:A:1329:LYS:HB2	1:A:1502:ASP:H	1.72	0.54
1:A:1411:GLU:HB2	1:A:1416:LYS:HD2	1.90	0.54
1:A:1308:ARG:HB3	1:A:1315:LEU:HA	1.90	0.53
1:A:1064:ILE:HG13	1:A:1084:PHE:HE2	1.74	0.53
1:A:1462:GLU:HG2	1:A:1492:ALA:HA	1.90	0.53
1:A:1305:TYR:HB3	1:A:1320:ILE:HB	1.90	0.53
1:A:264:SER:HA	1:A:267:GLN:CD	2.34	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1518:PRO:HA	1:A:1521:LEU:HD12	1.92	0.52
1:A:1406:ILE:HG12	1:A:1452:LEU:HD21	1.92	0.52
1:A:1409:ALA:HA	1:A:1412:LEU:HD12	1.92	0.51
1:A:1333:VAL:H	1:A:1506:VAL:HG22	1.76	0.51
1:A:344:LYS:HB2	1:A:581:THR:HG21	1.93	0.51
1:A:1299:LYS:HA	1:A:1324:ILE:HG22	1.93	0.51
1:A:1359:ILE:HG13	1:A:1360:ILE:HG13	1.92	0.50
1:A:2:LEU:HB3	1:A:5:PHE:HB3	1.92	0.50
1:A:1317:LEU:HD23	1:A:1510:GLY:HA2	1.94	0.50
1:A:1451:LEU:HD22	1:A:1482:GLU:HG3	1.93	0.50
1:A:93:GLN:HG3	1:A:95:THR:H	1.77	0.50
1:A:596:LEU:N	1:A:597:PRO:HD2	2.27	0.50
1:A:667:VAL:HG22	1:A:830:GLU:HB3	1.93	0.49
1:A:595:MET:HB3	1:A:599:MET:HE2	1.93	0.49
1:A:773:ARG:O	1:A:777:GLN:HG2	2.11	0.49
1:A:264:SER:O	1:A:267:GLN:HB2	2.12	0.48
1:A:28:GLU:HA	1:A:32:LEU:HD12	1.94	0.48
1:A:566:VAL:HG21	1:A:1003:TRP:HZ2	1.78	0.48
1:A:18:SER:HB3	1:A:19:PRO:HD2	1.96	0.48
1:A:806:PRO:O	1:A:811:LYS:HB3	2.13	0.48
1:A:305:VAL:HG22	1:A:306:PRO:HD2	1.94	0.47
1:A:1358:ILE:HG23	1:A:1362:GLY:HA3	1.96	0.47
1:A:668:ALA:HB2	1:A:828:VAL:HG21	1.96	0.47
1:A:332:ASN:HD22	1:A:374:GLN:HG3	1.79	0.47
1:A:822:MET:HA	1:A:825:LEU:HG	1.96	0.47
1:A:1116:ILE:HG12	1:A:1241:VAL:HG13	1.97	0.47
1:A:235:THR:O	1:A:239:VAL:HG23	2.15	0.46
1:A:1306:GLN:HB3	1:A:1315:LEU:HD22	1.98	0.46
1:A:349:PHE:O	1:A:350:ALA:HB3	2.16	0.46
1:A:637:MET:HG2	1:A:697:ILE:HG22	1.98	0.46
1:A:1294:TRP:N	1:A:1295:PRO:HD2	2.31	0.46
1:A:1514:GLU:HB3	1:A:1521:LEU:HD13	1.97	0.46
1:A:405:LEU:HD23	1:A:1170:LEU:HD11	1.98	0.46
1:A:631:CYS:HA	1:A:698:LYS:HG3	1.97	0.46
1:A:1105:CYS:HB2	1:A:1255:LEU:HD13	1.98	0.45
1:A:213:ILE:CG2	1:A:1140:PHE:HB3	2.47	0.45
1:A:1137:VAL:HG12	1:A:1207:LEU:HD12	1.99	0.45
1:A:266:GLN:O	1:A:267:GLN:C	2.59	0.45
1:A:372:LEU:HD23	1:A:372:LEU:HA	1.81	0.45
1:A:677:LYS:H	1:A:677:LYS:HG3	1.49	0.45
1:A:1226:MET:HA	1:A:1233:LEU:CD1	2.47	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:5:PHE:CD2	1:A:98:ALA:HB3	2.52	0.44
1:A:98:ALA:HA	1:A:101:TYR:HD1	1.82	0.44
1:A:542:LEU:HD12	1:A:542:LEU:HA	1.70	0.44
1:A:136:TRP:HB2	1:A:179:LEU:HD13	1.99	0.44
1:A:305:VAL:O	1:A:307:LYS:HG2	2.18	0.44
1:A:1378:THR:HB	1:A:1457:ILE:O	2.17	0.44
1:A:661:ILE:CG2	1:A:667:VAL:HG21	2.48	0.44
1:A:800:PHE:CD1	1:A:804:LEU:HB2	2.52	0.44
1:A:1305:TYR:HD2	1:A:1355:GLY:HA3	1.83	0.44
1:A:1294:TRP:HA	1:A:1297:LYS:HG2	2.01	0.43
1:A:1371:HIS:C	1:A:1373:LEU:H	2.25	0.43
1:A:1211:LEU:HD23	1:A:1211:LEU:HA	1.83	0.43
1:A:514:TYR:HD2	1:A:1379:ILE:HG21	1.84	0.43
1:A:357:LEU:HD23	1:A:357:LEU:HA	1.87	0.43
1:A:64:LEU:HD12	1:A:64:LEU:HA	1.67	0.43
3:A:1602:ANP:H8	3:A:1602:ANP:O1A	2.18	0.43
1:A:1064:ILE:HD13	1:A:1064:ILE:HA	1.94	0.42
1:A:238:LEU:HA	1:A:238:LEU:HD12	1.72	0.42
1:A:1242:LEU:HD13	1:A:1242:LEU:HA	1.84	0.42
1:A:1065:LEU:HD13	1:A:1065:LEU:HA	1.88	0.42
1:A:1415:LEU:HA	1:A:1415:LEU:HD22	1.81	0.42
1:A:508:GLY:HA3	1:A:1387:PHE:HE1	1.84	0.42
1:A:672:PRO:HD2	1:A:834:LEU:O	2.20	0.42
1:A:1224:LEU:HD12	1:A:1224:LEU:HA	1.92	0.42
1:A:1226:MET:HE3	1:A:1241:VAL:HG11	2.02	0.42
1:A:642:ALA:HA	1:A:693:GLY:HA3	2.00	0.42
1:A:1348:PHE:HD1	1:A:1374:ARG:HG2	1.84	0.42
1:A:49:LEU:HD23	1:A:52:TYR:HD2	1.84	0.42
1:A:1003:TRP:HA	1:A:1023:ARG:HD3	2.02	0.42
1:A:85:LEU:O	1:A:89:GLU:HG3	2.20	0.41
1:A:661:ILE:HG22	1:A:667:VAL:HG21	2.02	0.41
1:A:1107:LEU:HD23	1:A:1107:LEU:HA	1.92	0.41
1:A:1155:THR:O	1:A:1158:PRO:HD2	2.20	0.41
1:A:1302:PHE:HB2	1:A:1322:CYS:H	1.85	0.41
1:A:738:ALA:O	1:A:741:PRO:HD2	2.20	0.41
1:A:1348:PHE:HB3	1:A:1374:ARG:HE	1.85	0.41
1:A:1371:HIS:C	1:A:1373:LEU:N	2.77	0.41
1:A:1430:VAL:HG12	1:A:1434:GLY:HA2	2.01	0.41
1:A:177:LEU:HD23	1:A:177:LEU:HA	1.85	0.41
1:A:566:VAL:HG21	1:A:1003:TRP:CZ2	2.55	0.41
1:A:1099:LEU:HD23	1:A:1099:LEU:HA	1.92	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1395:LEU:HD23	1:A:1449:ARG:HG2	2.02	0.41
1:A:1519:GLU:H	1:A:1519:GLU:HG3	1.54	0.41
1:A:450:LEU:HD23	1:A:450:LEU:HA	1.95	0.41
1:A:498:ARG:HG3	1:A:525:VAL:HG13	2.03	0.41
1:A:565:TYR:CZ	1:A:572:ASN:HB3	2.56	0.41
1:A:821:SER:HB3	1:A:823:HIS:CD2	2.56	0.41
1:A:1347:LEU:O	1:A:1373:LEU:HD21	2.21	0.41
1:A:1221:PHE:O	1:A:1225:MET:HG2	2.21	0.41
1:A:1504:VAL:HG23	1:A:1518:PRO:HD3	2.03	0.40
1:A:1155:THR:C	1:A:1158:PRO:HD2	2.46	0.40
1:A:639:PHE:HB2	1:A:659:LEU:H	1.85	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	1392/1545 (90%)	1378 (99%)	14 (1%)	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	1242/1372 (90%)	1153 (93%)	89 (7%)	12 38

All (89) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	4	LYS
1	A	5	PHE
1	A	6	CYS
1	A	33	VAL
1	A	56	THR
1	A	64	LEU
1	A	82	GLU
1	A	87	LEU
1	A	128	ASN
1	A	129	SER
1	A	134	LEU
1	A	148	GLN
1	A	156	GLN
1	A	176	ILE
1	A	197	ILE
1	A	204	ILE
1	A	229	VAL
1	A	238	LEU
1	A	246	MET
1	A	261	GLN
1	A	263	LYS
1	A	305	VAL
1	A	346	LEU
1	A	353	ARG
1	A	355	THR
1	A	451	SER
1	A	542	LEU
1	A	551	GLN
1	A	600	ILE
1	A	603	MET
1	A	638	GLN
1	A	654	VAL
1	A	661	ILE
1	A	662	MET
1	A	670	ILE
1	A	677	LYS
1	A	706	GLN
1	A	729	ARG

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Mol	Chain	Res	Type
1	A	731	GLN
1	A	734	LEU
1	A	760	ASN
1	A	761	LEU
1	A	784	LEU
1	A	817	LEU
1	A	822	MET
1	A	827	GLN
1	A	848	LEU
1	A	977	PHE
1	A	989	ASN
1	A	1001	SER
1	A	1013	THR
1	A	1015	TYR
1	A	1065	LEU
1	A	1066	ARG
1	A	1097	GLN
1	A	1104	THR
1	A	1126	ILE
1	A	1170	LEU
1	A	1177	GLU
1	A	1210	ARG
1	A	1227	VAL
1	A	1236	ASP
1	A	1242	LEU
1	A	1251	THR
1	A	1257	ARG
1	A	1274	GLU
1	A	1279	GLU
1	A	1285	VAL
1	A	1294	TRP
1	A	1300	ILE
1	A	1305	TYR
1	A	1312	GLU
1	A	1315	LEU
1	A	1316	VAL
1	A	1318	ARG
1	A	1324	ILE
1	A	1336	THR
1	A	1358	ILE
1	A	1365	ILE
1	A	1367	SER

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Mol	Chain	Res	Type
1	A	1373	LEU
1	A	1379	ILE
1	A	1415	LEU
1	A	1452	LEU
1	A	1470	GLU
1	A	1482	GLU
1	A	1493	HIS
1	A	1512	ILE
1	A	1519	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (28) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	118	GLN
1	A	146	GLN
1	A	156	GLN
1	A	245	HIS
1	A	261	GLN
1	A	332	ASN
1	A	341	GLN
1	A	447	GLN
1	A	551	GLN
1	A	577	GLN
1	A	629	HIS
1	A	638	GLN
1	A	658	ASN
1	A	690	ASN
1	A	706	GLN
1	A	711	GLN
1	A	731	GLN
1	A	823	HIS
1	A	827	GLN
1	A	1054	ASN
1	A	1057	HIS
1	A	1062	ASN
1	A	1193	ASN
1	A	1301	GLN
1	A	1414	HIS
1	A	1436	ASN
1	A	1443	GLN
1	A	1496	HIS

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 3 ligands modelled in this entry, 2 are monoatomic - leaving 1 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
3	ANP	A	1602	-	29,33,33	1.21	5 (17%)	31,52,52	1.12	4 (12%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	ANP	A	1602	-	-	9/14/38/38	0/3/3/3

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1602	ANP	PG-O1G	3.19	1.51	1.46
3	A	1602	ANP	PB-O1B	2.93	1.50	1.46
3	A	1602	ANP	PB-O2B	-2.24	1.50	1.56

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1602	ANP	PG-O3G	-2.09	1.51	1.56
3	A	1602	ANP	PG-O2G	-2.04	1.51	1.56

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	1602	ANP	O2B-PB-O1B	4.08	118.47	109.92
3	A	1602	ANP	C5-C6-N6	2.26	123.79	120.35
3	A	1602	ANP	O2G-PG-O1G	-2.02	108.37	113.45
3	A	1602	ANP	O3G-PG-O1G	-2.00	108.41	113.45

There are no chirality outliers.

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	1602	ANP	PB-N3B-PG-O1G
3	A	1602	ANP	PA-O3A-PB-O1B
3	A	1602	ANP	PA-O3A-PB-O2B
3	A	1602	ANP	C5'-O5'-PA-O1A
3	A	1602	ANP	C3'-C4'-C5'-O5'
3	A	1602	ANP	O4'-C4'-C5'-O5'
3	A	1602	ANP	PG-N3B-PB-O3A
3	A	1602	ANP	C4'-C5'-O5'-PA
3	A	1602	ANP	C5'-O5'-PA-O3A

There are no ring outliers.

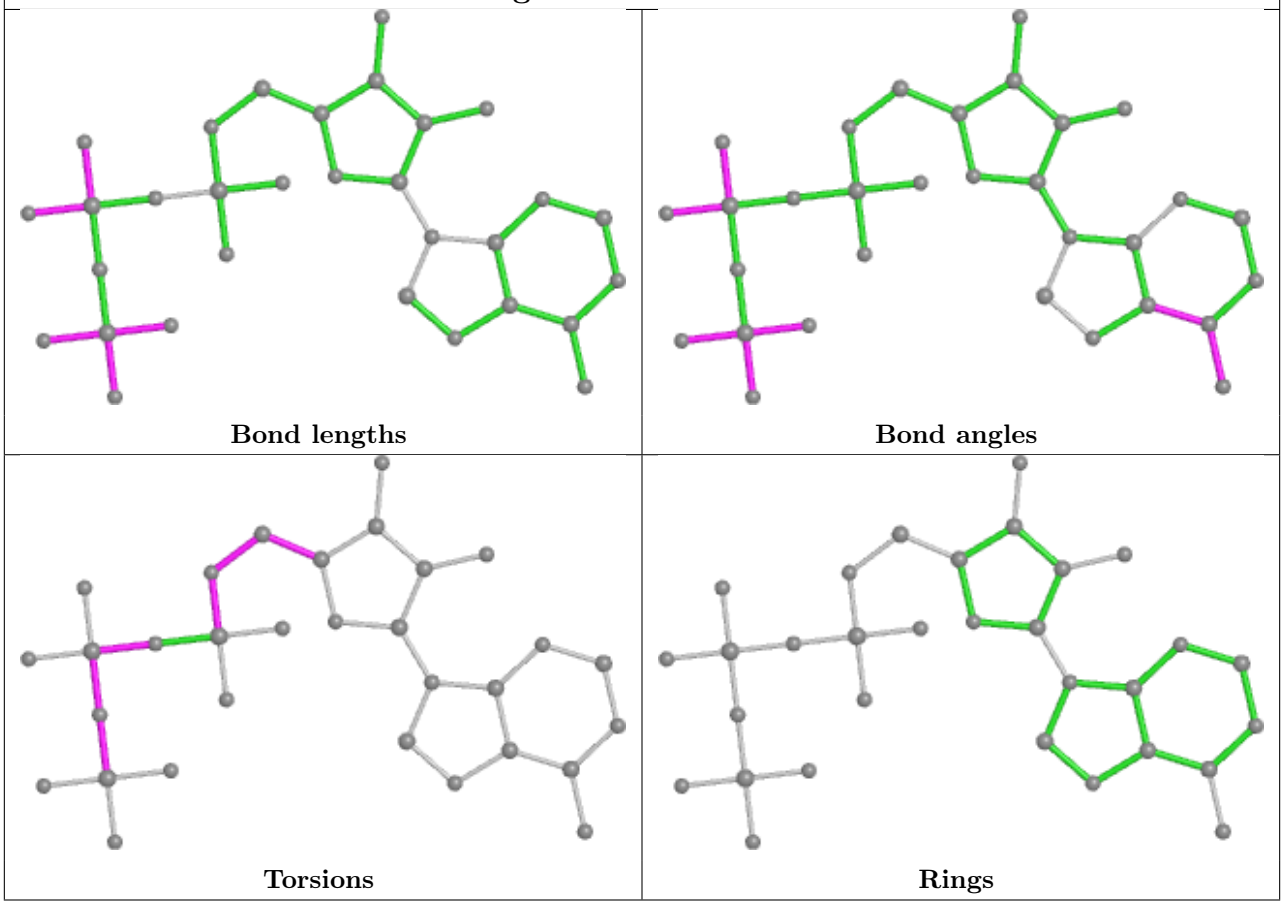
1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	1602	ANP	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier.

The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand ANP A 1602



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

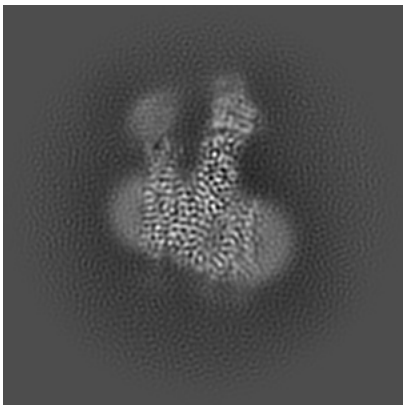
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-61619. These allow visual inspection of the internal detail of the map and identification of artifacts.

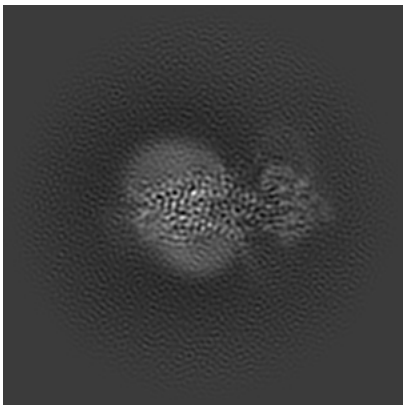
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

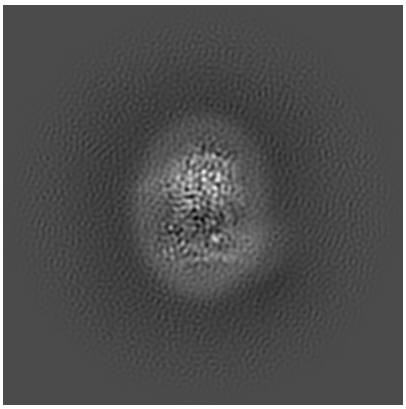
6.1.1 Primary map



X

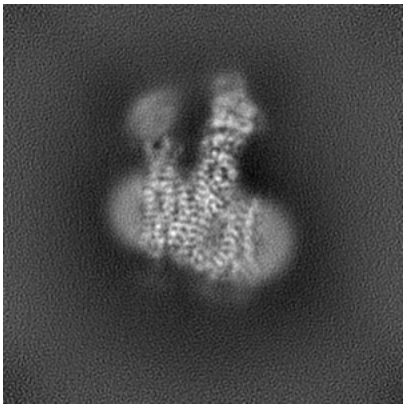


Y

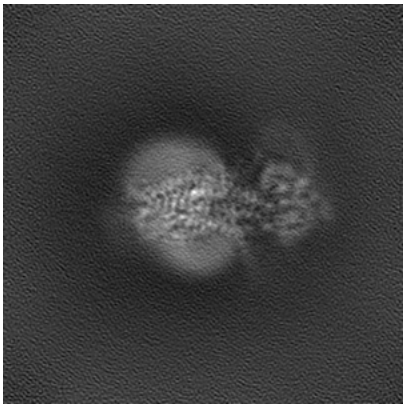


Z

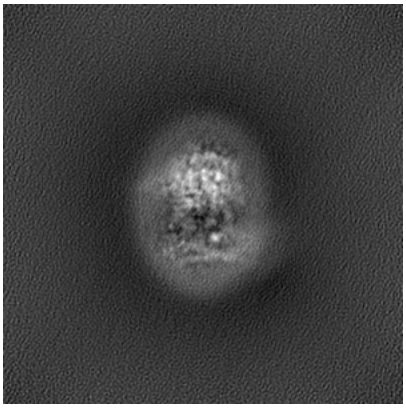
6.1.2 Raw map



X



Y

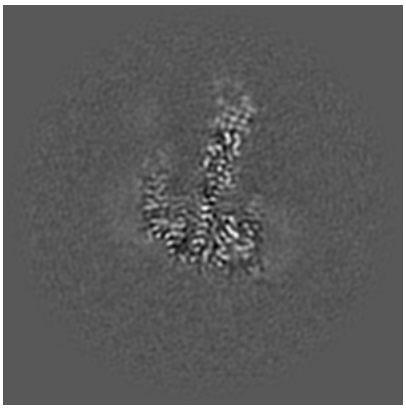


Z

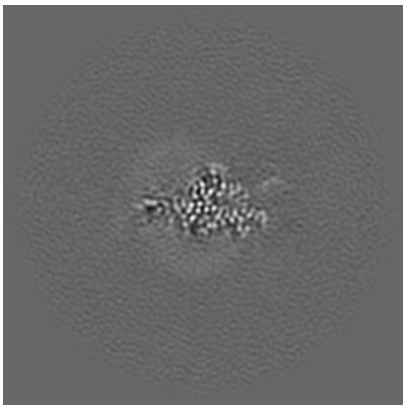
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

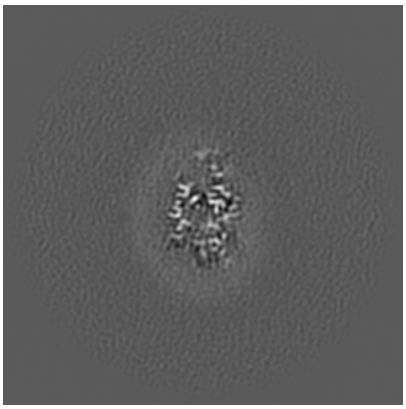
6.2.1 Primary map



X Index: 120

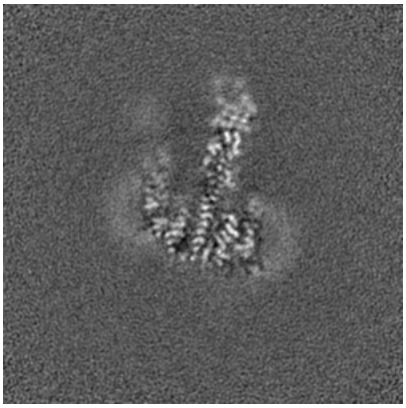


Y Index: 120

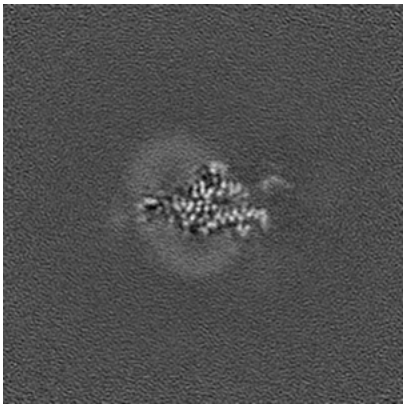


Z Index: 120

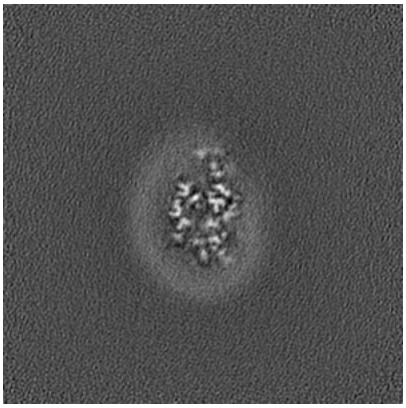
6.2.2 Raw map



X Index: 120



Y Index: 120

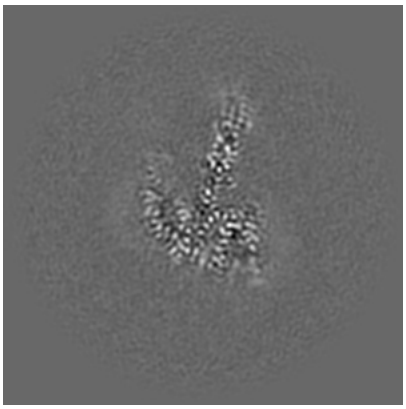


Z Index: 120

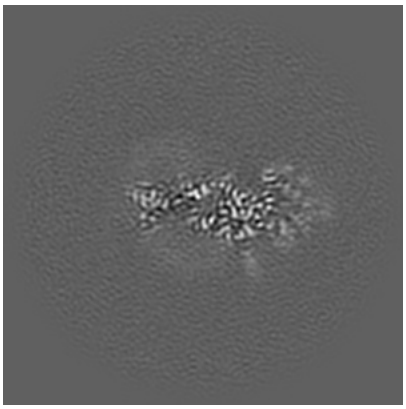
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

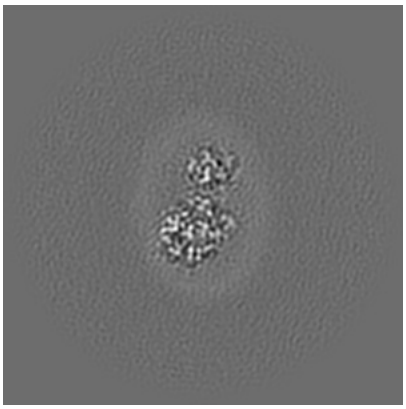
6.3.1 Primary map



X Index: 122

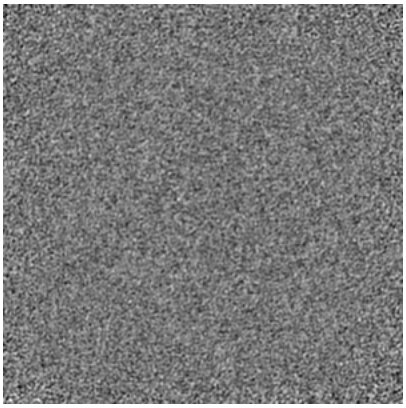


Y Index: 130

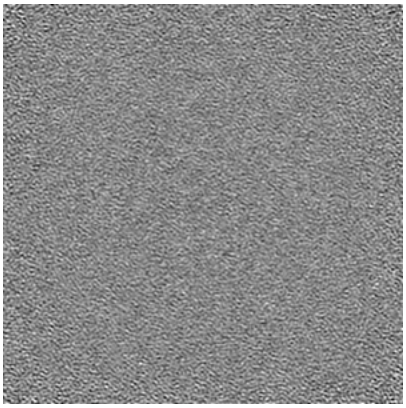


Z Index: 107

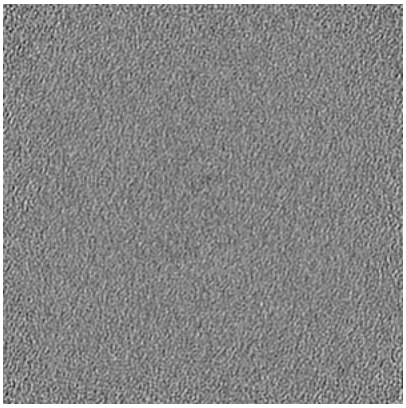
6.3.2 Raw map



X Index: 0



Y Index: 0

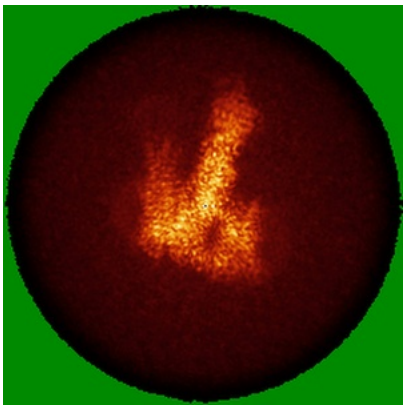


Z Index: 0

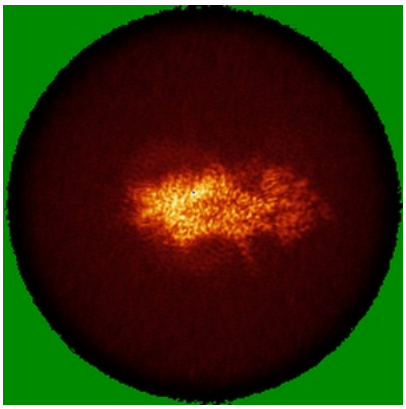
The images above show the largest variance slices of the map in three orthogonal directions.

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

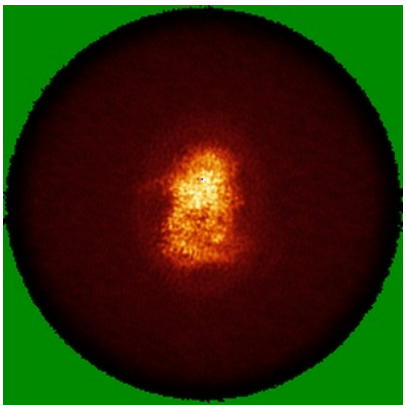
6.4.1 Primary map



X

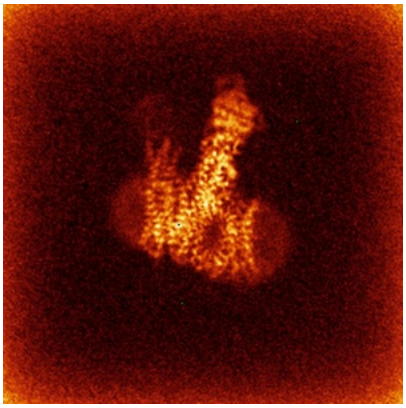


Y

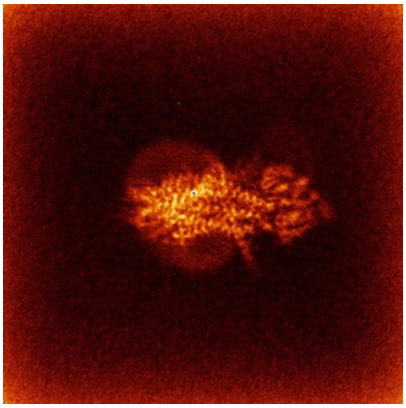


Z

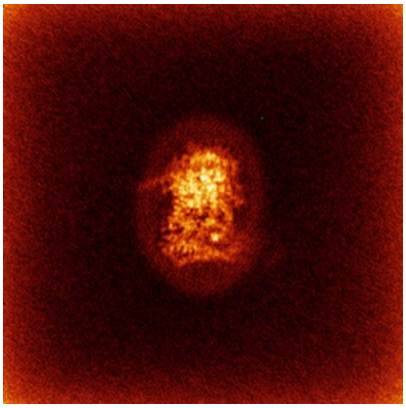
6.4.2 Raw map



X



Y

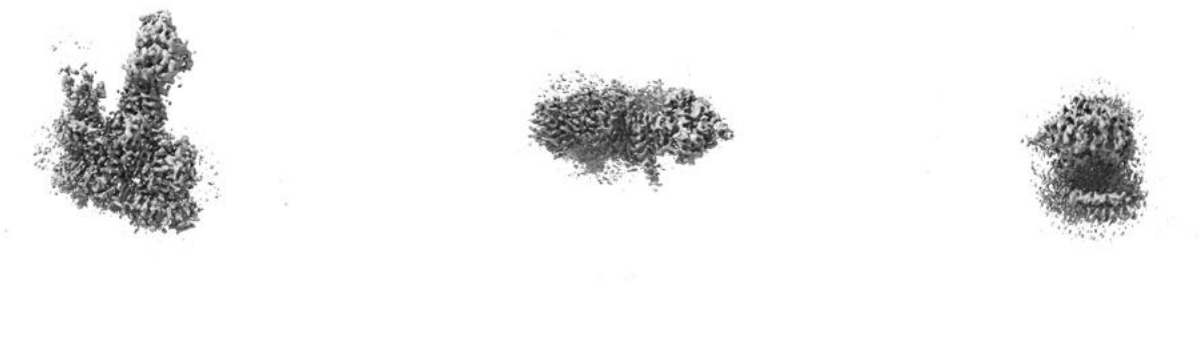


Z

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 0.14. 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.

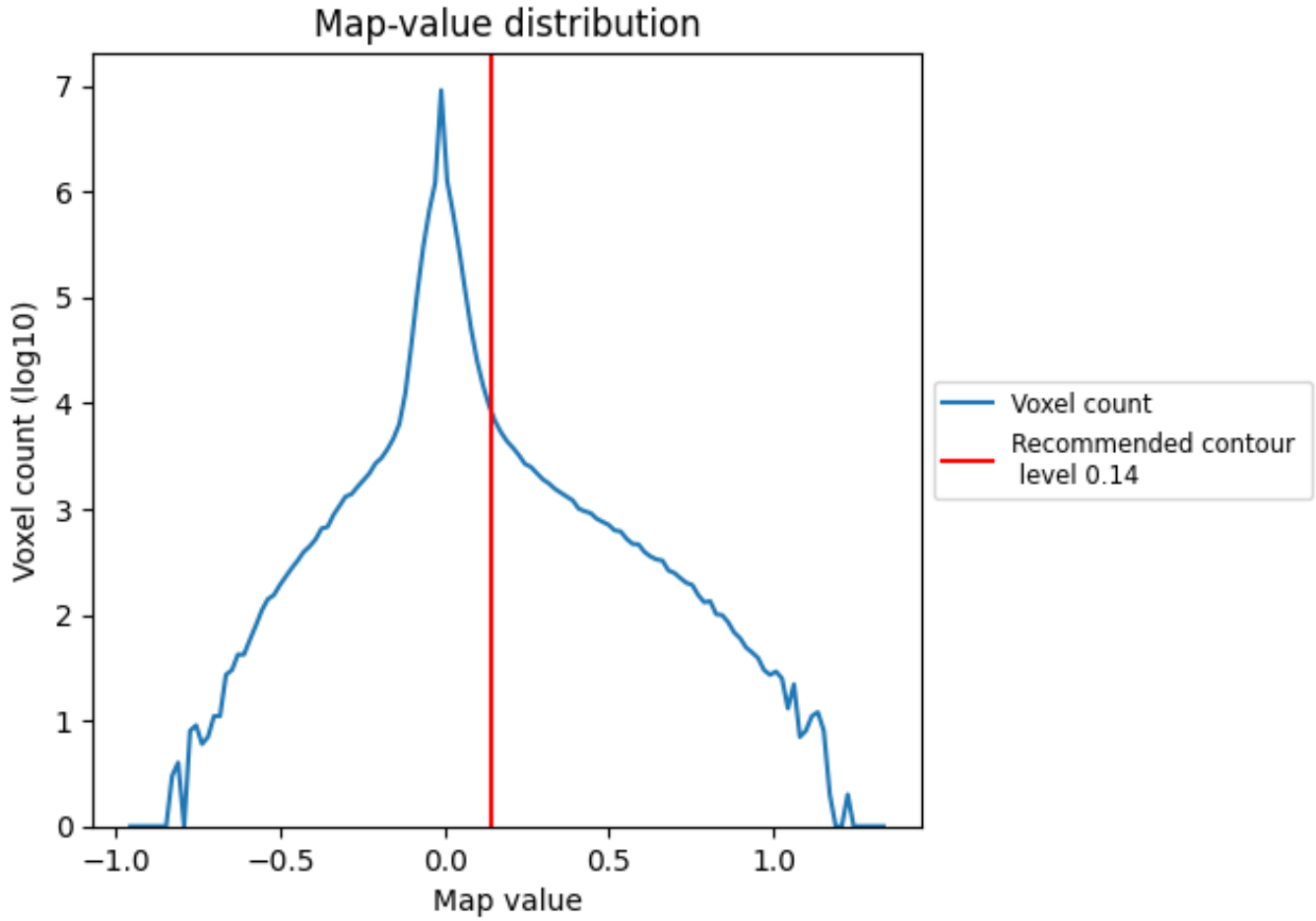
6.6 Mask visualisation (i)

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

7 Map analysis

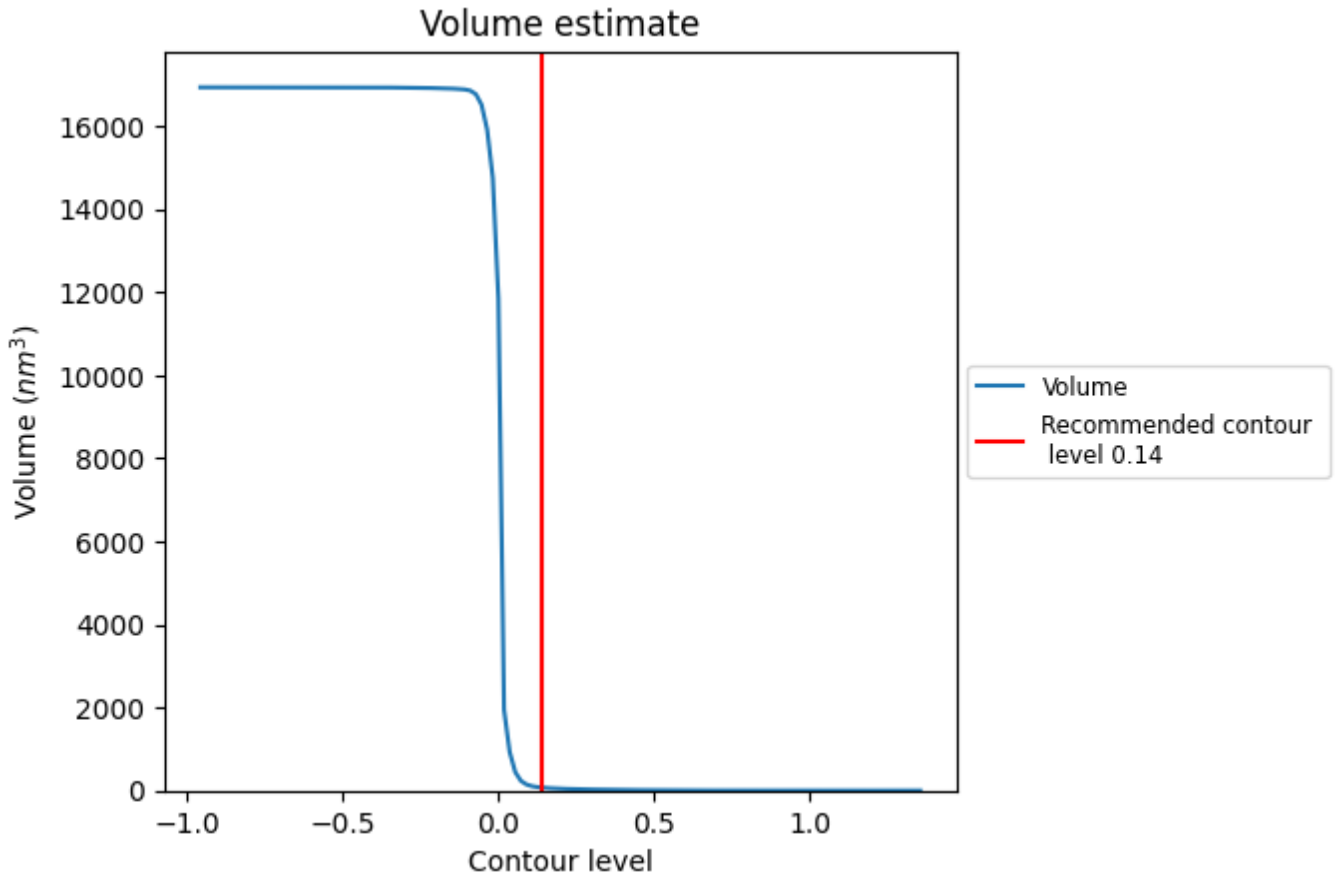
This section contains the results of statistical analysis of the map.

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.

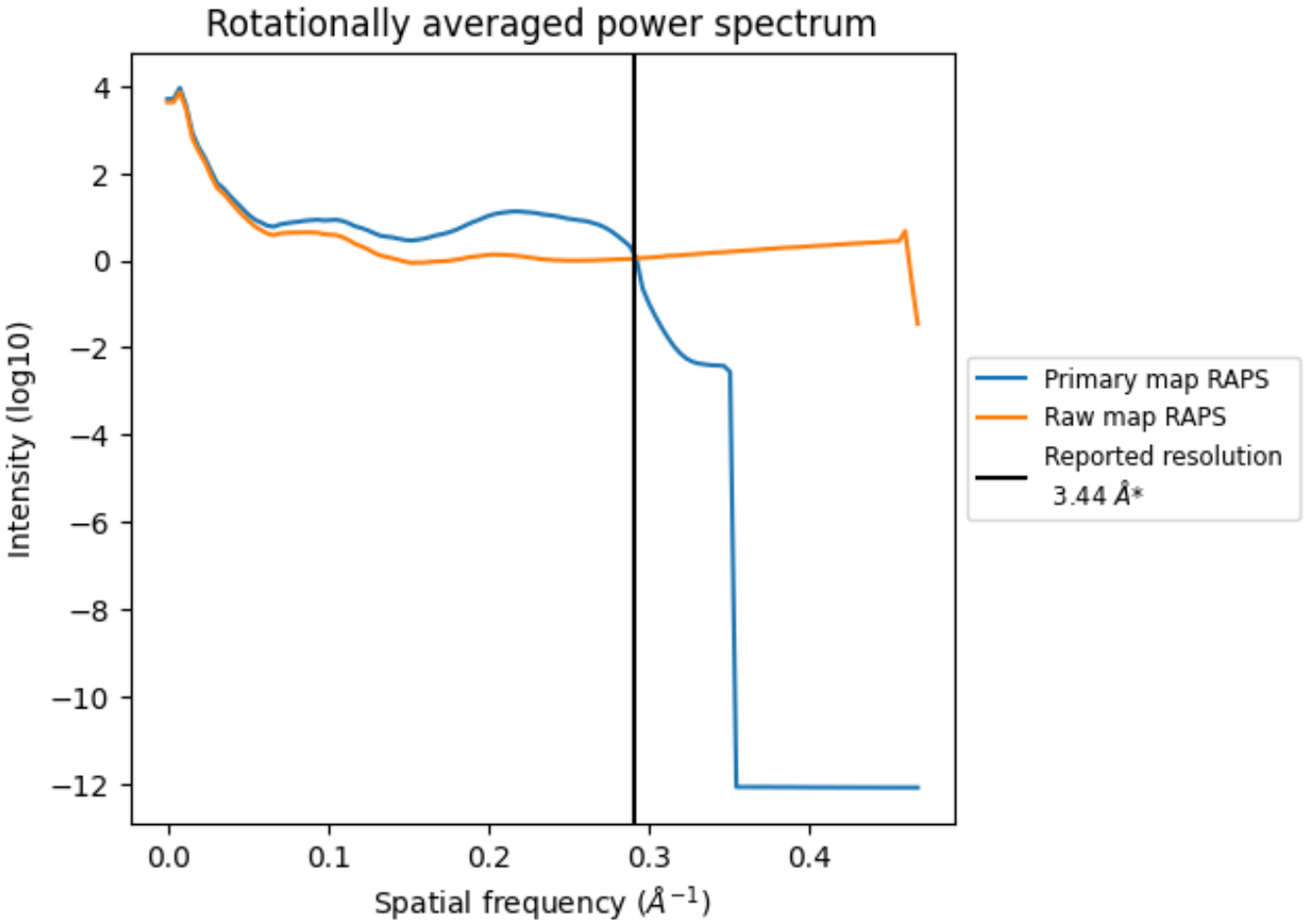
7.2 Volume estimate



The volume at the recommended contour level is 71 nm^3; this corresponds to an approximate mass of 64 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)

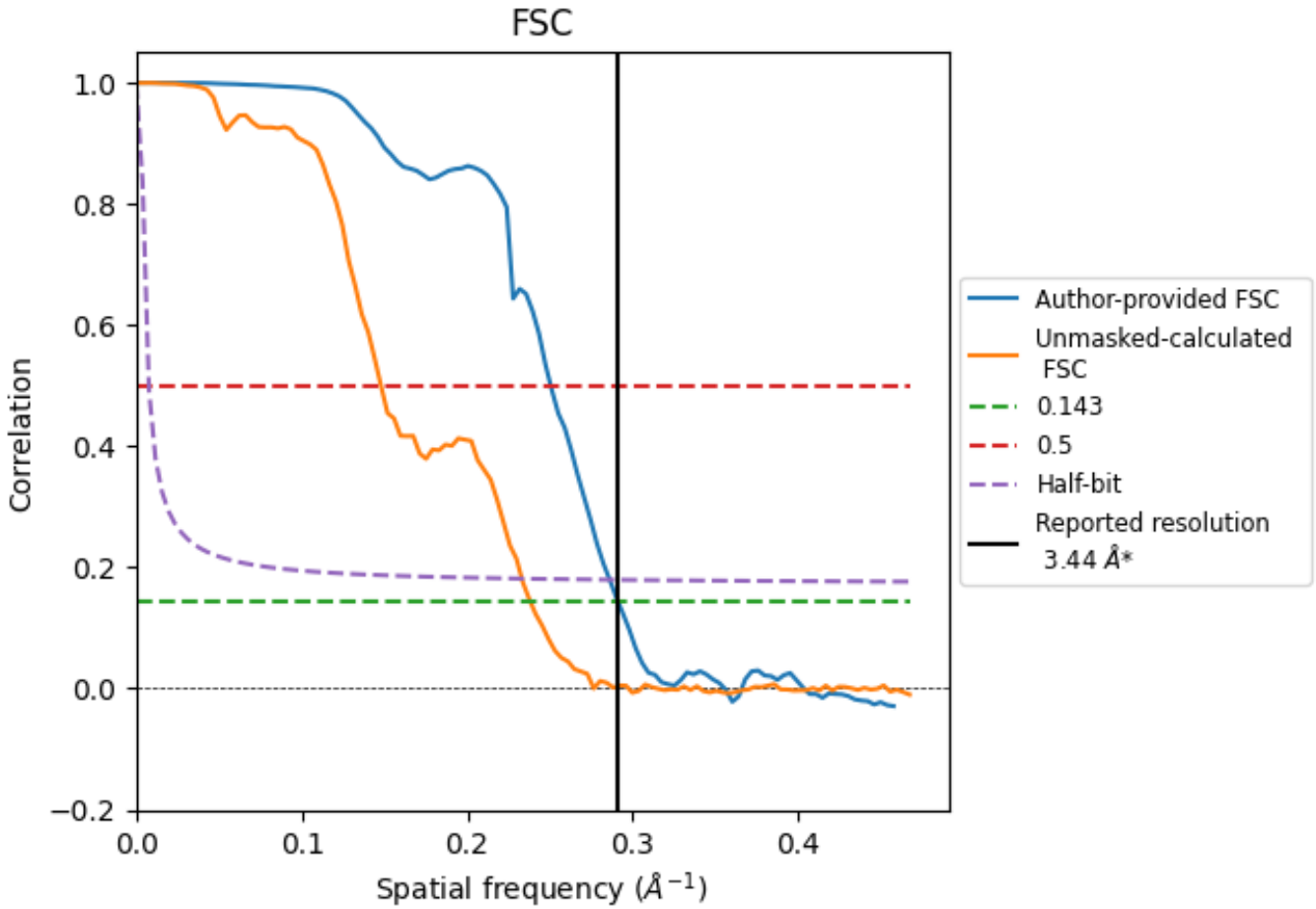


*Reported resolution corresponds to spatial frequency of 0.291 Å^{-1}

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 0.291 Å^{-1}

8.2 Resolution estimates (i)

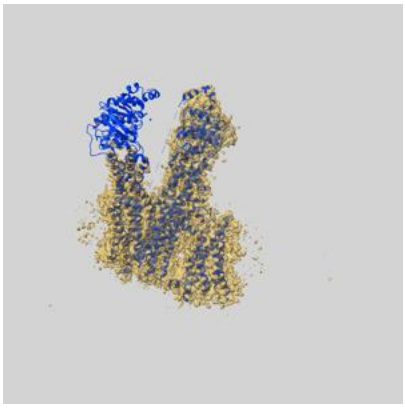
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.44	-	-
Author-provided FSC curve	3.43	3.99	3.50
Unmasked-calculated*	4.20	6.76	4.29

*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 4.20 differs from the reported value 3.44 by more than 10 %

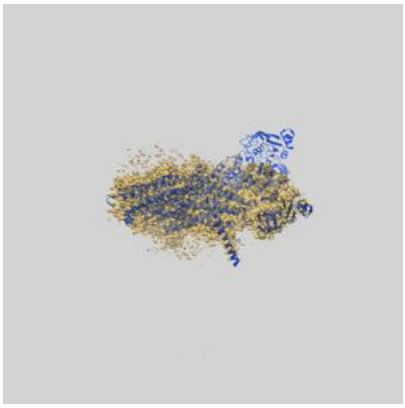
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-61619 and PDB model 9JN2. Per-residue inclusion information can be found in section 3 on page 4.

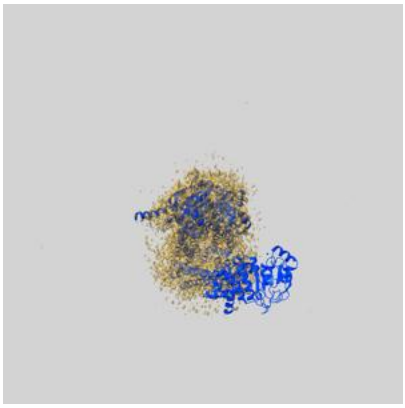
9.1 Map-model overlay



X



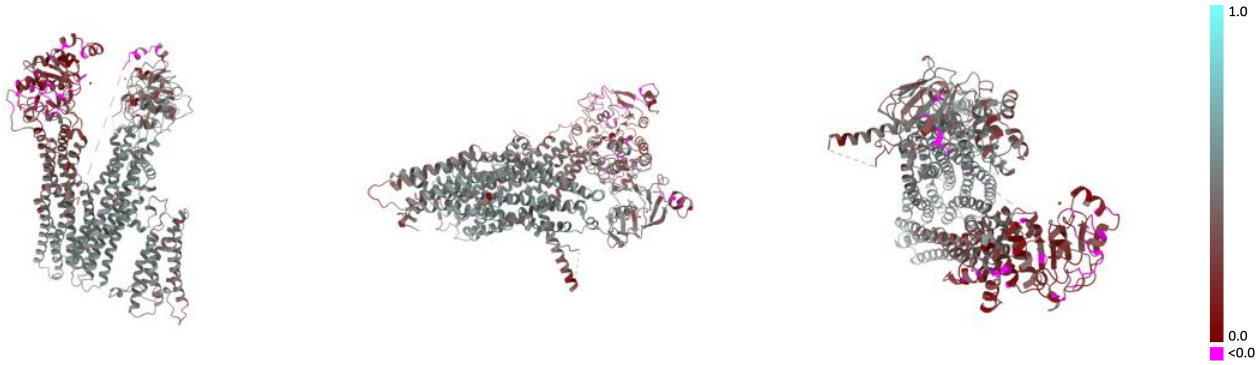
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.14 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.

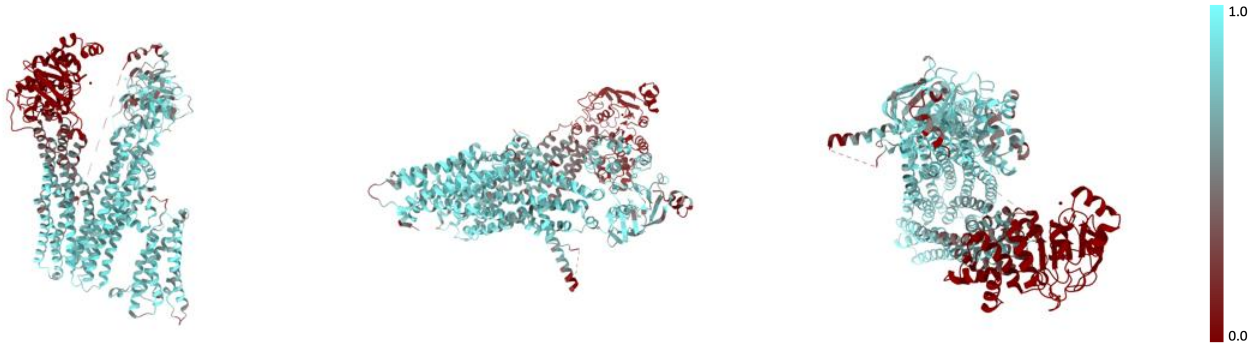
9.2 Q-score mapped to coordinate model (i)



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.

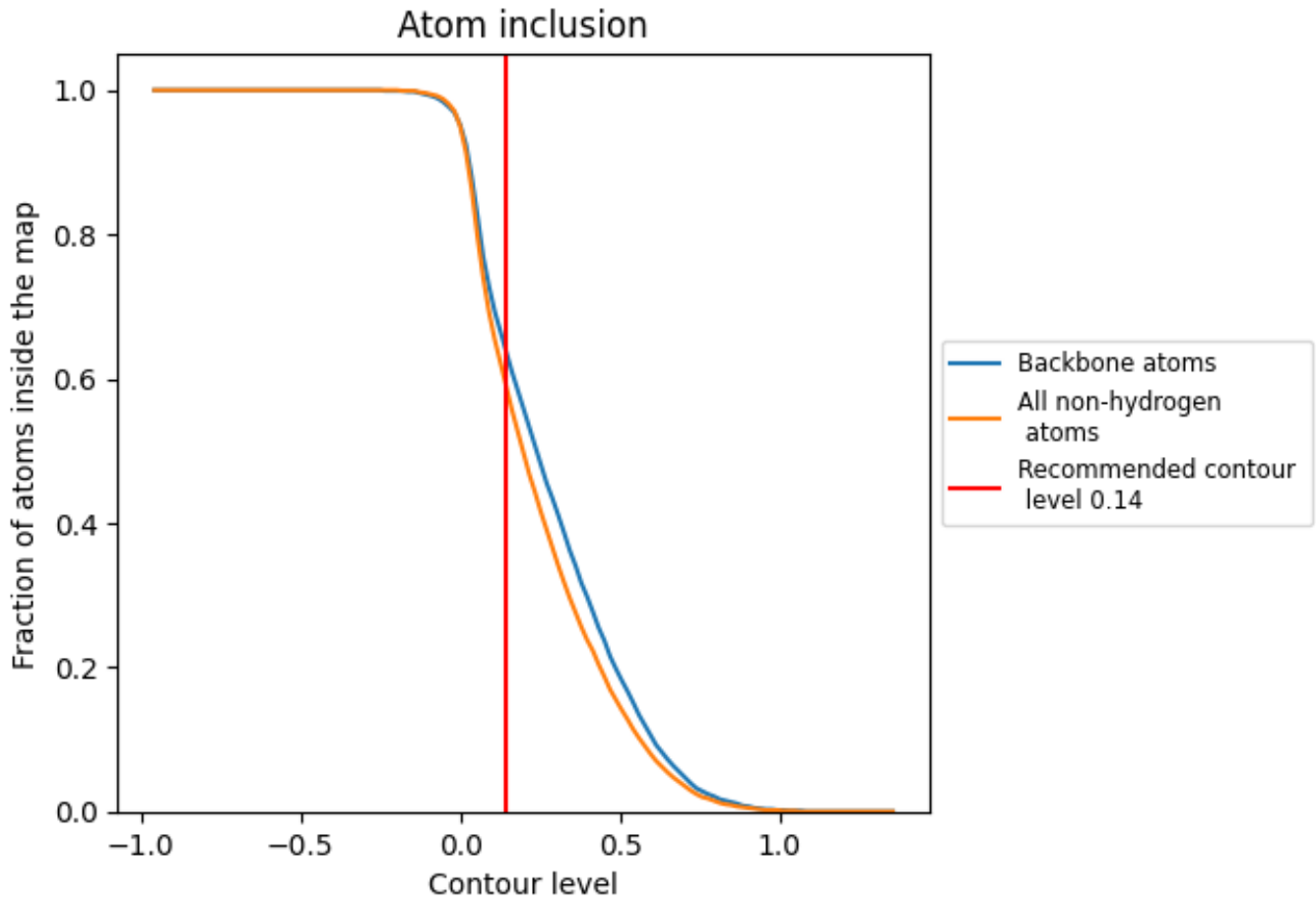
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.14).

9.4 Atom inclusion (i)



At the recommended contour level, 64% of all backbone atoms, 60% 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 (0.14) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.5970	0.3960
A	0.5970	0.3960