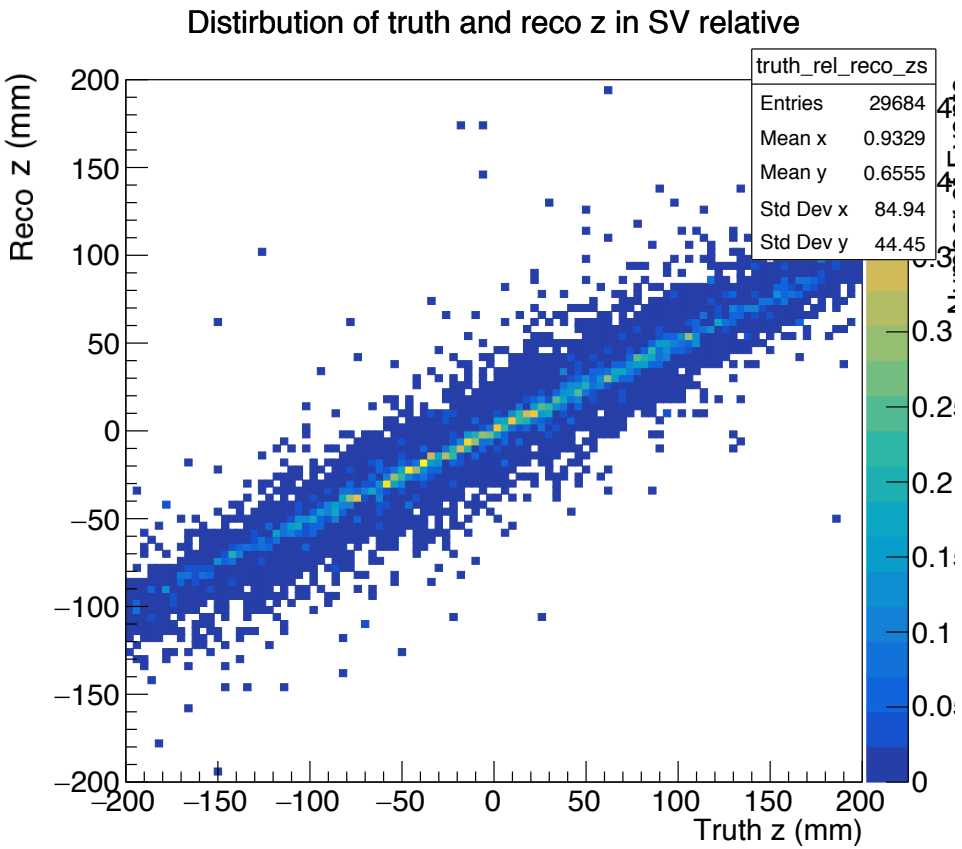
- Truth Lxy calculation from FlavourTagPerformanceFramework:
  - Code from https://gitlab.cern.ch/atlas-flavor-tagging-tools/FlavourTagPerformanceFramework/blob/freshstart/btagAnalysis/src/BHadronBranches.cxx

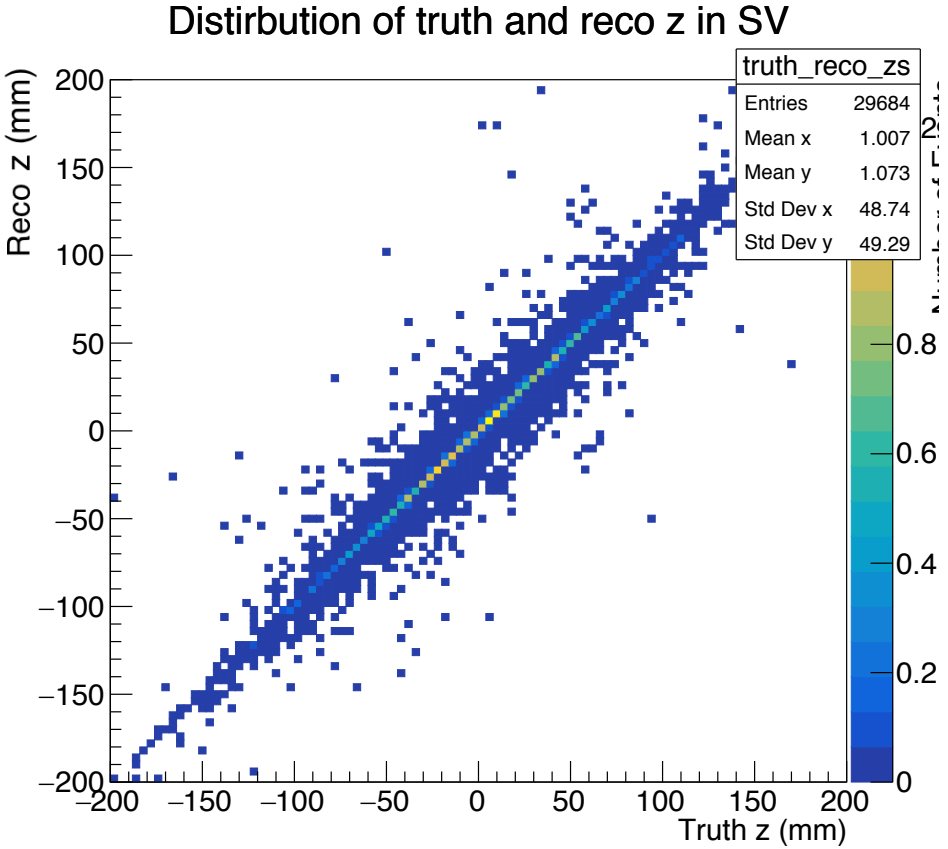
```
if(myB->hasDecayVtx()){
      j_bH_Lxy.push_back( sqrt( pow(myB->decayVtx()->x(), 2) + pow(myB->decayVtx()->y(), 2) )  );
      j_bH_x.push_back( myB->decayVtx()->x()  );
      j_bH_y.push_back( myB->decayVtx()->y() );
      j_bH_z.push_back( myB->decayVtx()->z()  );
}else{
```

  - myB is a truth B hadron associated with the jet.
- Reco Lxy calculation from https://acode-browser.usatlas.bnl.gov/lxr/source/athena/PhysicsAnalysis/JetTagging/JetTagTools/src/SVTag.cxx?v=21.2

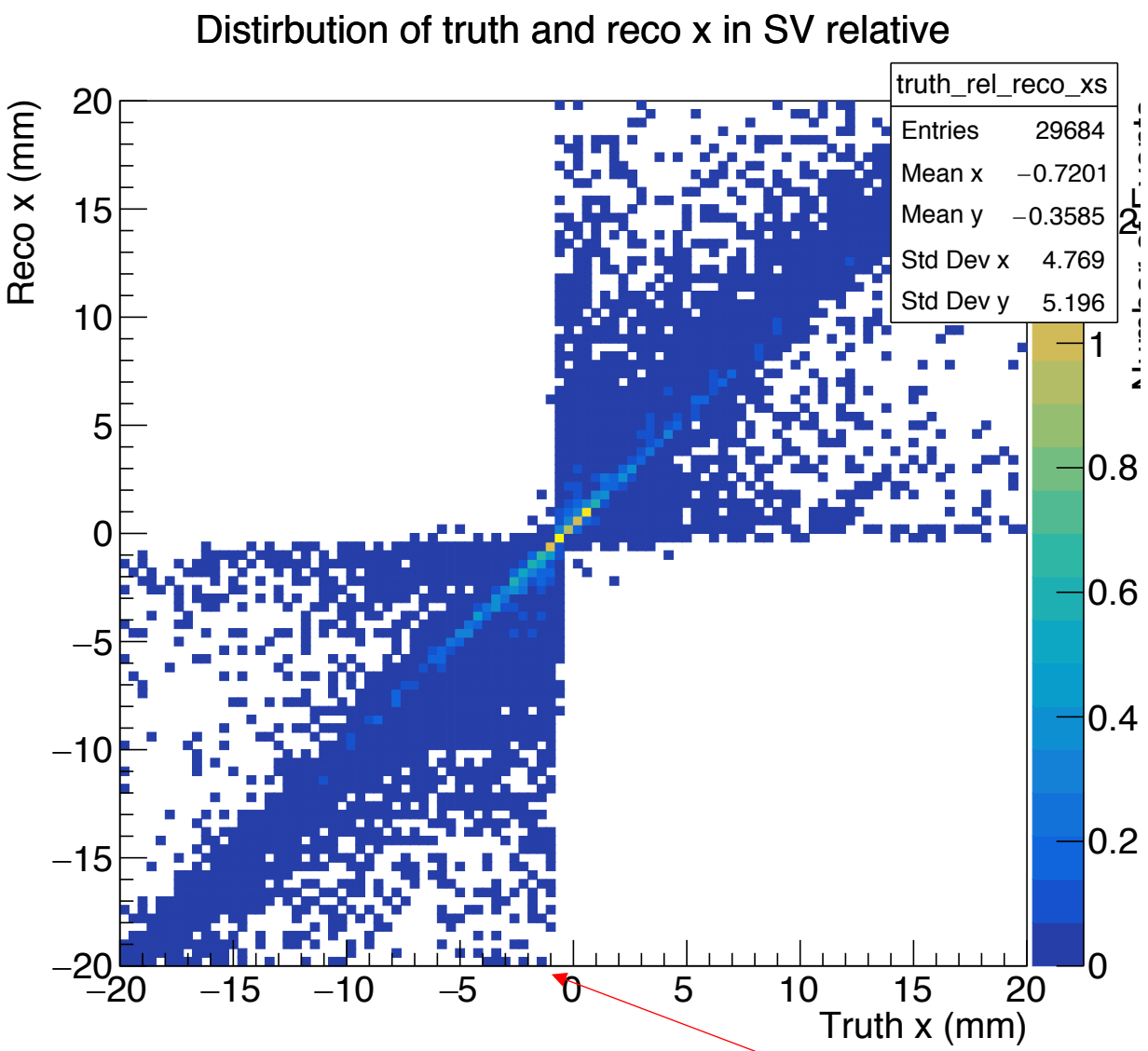
```
Amg::Vector3D jetDir(jetToTag.p4().Px(),jetToTag.p4().Py(),jetToTag.p4().Pz());
const Amg::Vector3D PVposition = m_priVtx->position();
const Amg::Vector3D position = firstVertex->position();
Amg::Vector3D PvSvDir( position.x() - PVposition.x(),
               position.y() - PVposition.y(),
               position.z() - PVposition.z() );
double drJPVSV_1 = Amg::deltaR(jetDir,PvSvDir);
drJPVSV = drJPVSV_1;
// for flipped taggers, use -jet direction:
double drJPVSV_2 = Amg::deltaR(-jetDir, PvSvDir); // for negative tags
if ( m_isFlipped ) drJPVSV = drJPVSV_2; // for negative tags
ATH_MSG_VERBOSE("#BTAG# DRJPVSV regular="<<drJPVSV_1<<" flipped="<<drJPVSV_2<<" chosen="<<drJPVSV);

Lxy=sqrt(pow(PvSvDir(0,0),2)+pow(PvSvDir(1,0),2));
```

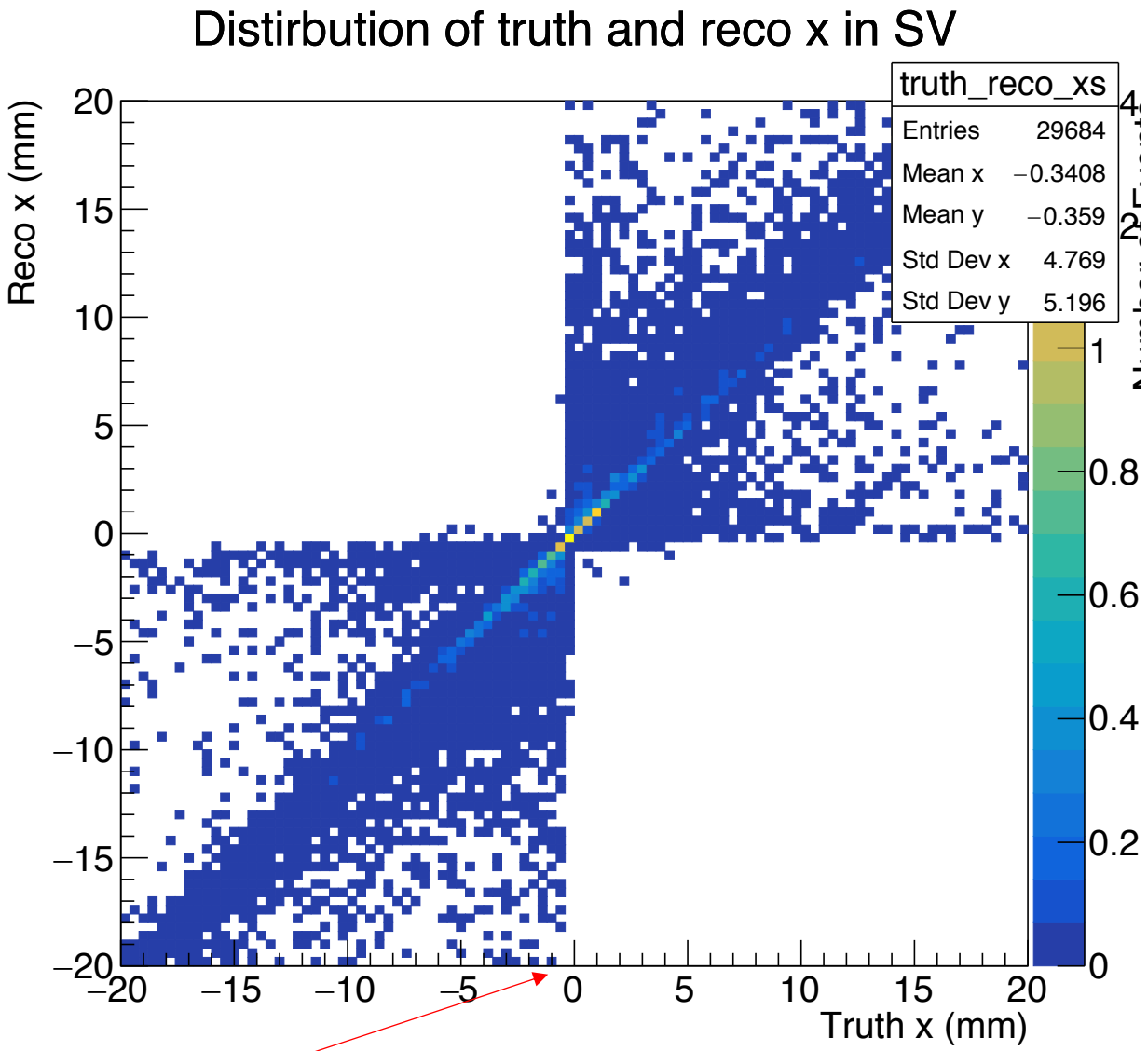
- Why is truth Lxy defined only as position not as relative position to truth PV?
- Checked: truth PV is not defined as (0,0,0)



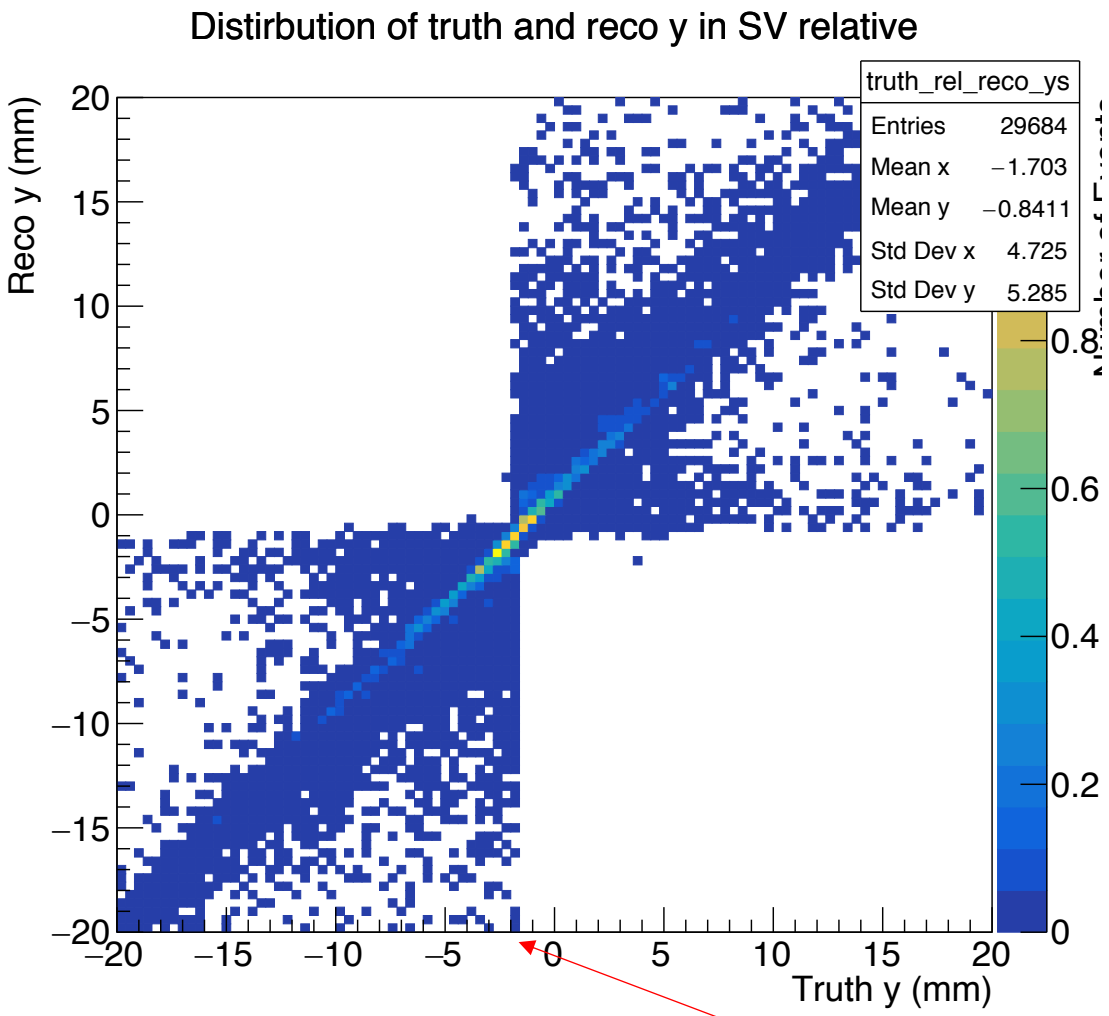


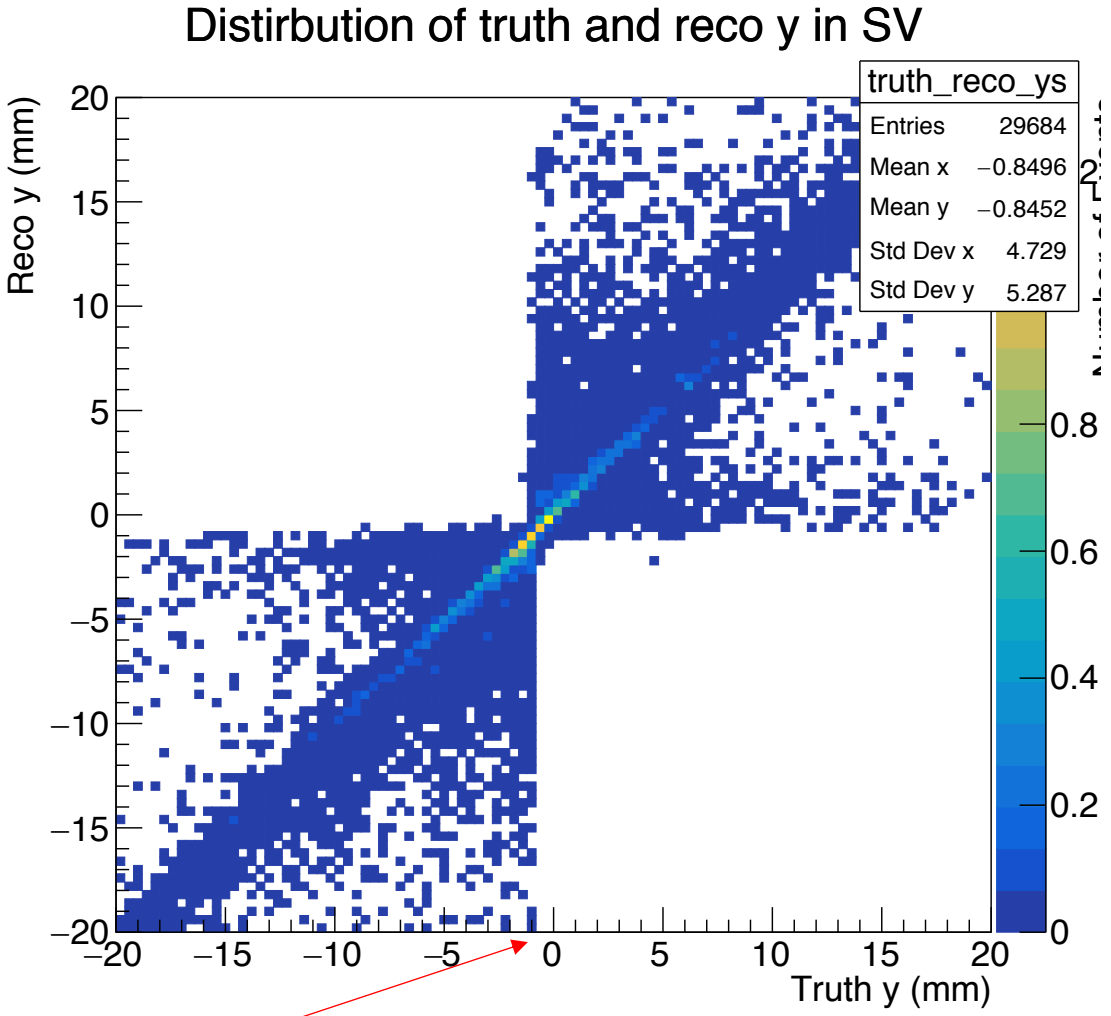
If we compare (truth secondary vertex z + truth PV) with Reco z, as shown on the left, the coordinates don't match…
Similarly with x and y (see next two slides)





Left graph (treating truth decay x as relative to PV, and thus comparing reco SV x with (truth decay x + truth PV x) is more off center.





Left graph (treating truth decay y as relative to PV, and thus comparing reco SV y with (truth decay y + truth PV y) is more off center.