CF from MPD detector

- Physics model: vHLLE AuAu $\sqrt{s_{NN}}$=11.5 GeV 0-5%
- MC: GEANT+MPD root
- Statistics: 1e4 events
- Reconstructed CF (problem is fixed)
- Anti-merging and anti-splitting $\Delta\eta$ — $\Delta\varphi$ cut

recCF_fto.cxx

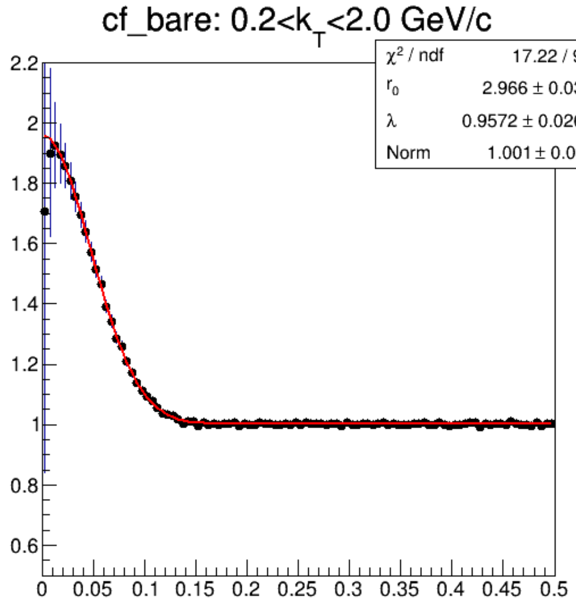
```
MpdTrack *track = (MpdTrack*) event->GetGlobalTracks()->UncheckedAt(iTrack);
if( !track ) continue;// Check that track exists
if( !isGoodTrack( track ) ) continue;// Apply track cut
FairMCTrack *mcTr = (FairMCTrack*) mctrack->UncheckedAt(track->GetID());
if( !mcTr ) continue;
if( mcTr->GetPdgCode()!=cPDG )continue;
if( mcTr->GetMotherId()!=-1 )continue;//primary?
if( track->GetPidProbPion()<0.99 )continue;
pa[it].mf.SetXYZM(track->GetPx(),track->GetPy(),track->GetPz(),cMas);//Reco track
pa[it].mi.SetXYZM(mcTr->GetPx(),mcTr->GetPy(),mcTr->GetPz(),cMas);//MC track
//pa[it].mi.SetXYZM(gRandom->Gaus(0,0.1),gRandom->Gaus(0,0.1),gRandom->Gaus(0,0.1),cMas);//test
pa[it].id=mcTr->GetPdgCode();
pa[it].pac.SetXYZ(track->GetFirstPointX(),track->GetFirstPointY(),track->GetFirstPointZ());
pa[it].ev=k;
pa[it].co.SetXYZT(gRandom->Gaus(0,cR0),gRandom->Gaus(0,cR0),gRandom->Gaus(0,cR0),0);
```

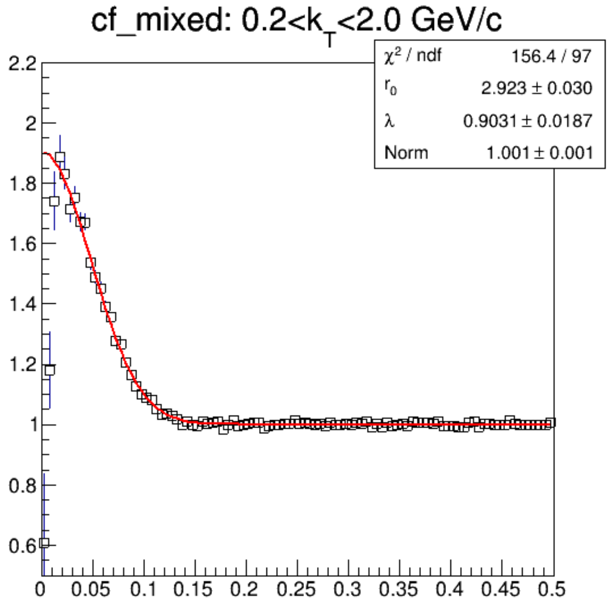
recCF_fto.cxx

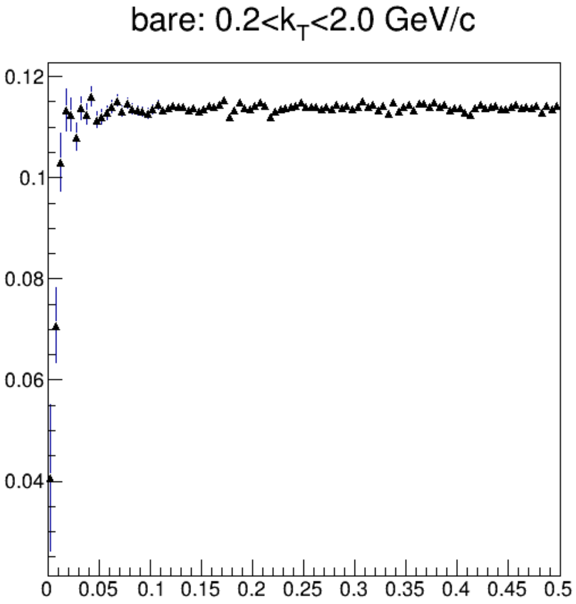
QS femoscopy weight: 1+cos(Δx*Δp)
x and p should be in the same system

```
//Boost to PRF------------------------------------------>
        TLorentzVector a=pa[i].mi;//MC track
        TLorentzVector b=pa[j].mi;//MC track
        Double_t QinvMC=EposFemtoQinv4vec(a,b);
        Double_t bx = ( a.Px() + b.Px() ) / ( a.E() + b.E() );
        Double_t by = ( a.Py() + b.Py() ) / ( a.E() + b.E() );
        Double_t bz = ( a.Pz() + b.Pz() ) / ( a.E() + b.E() );
        TVector3 vPRF ;
        vPRF.SetXYZ(bx, by,  bz);
        a.Boost(-vPRF); // go to
        b.Boost(-vPRF); // PRF
```

CFs: no Δη — Δφ* cut







$\Delta\eta$ — $\Delta\varphi^*$ cut (ALICE)

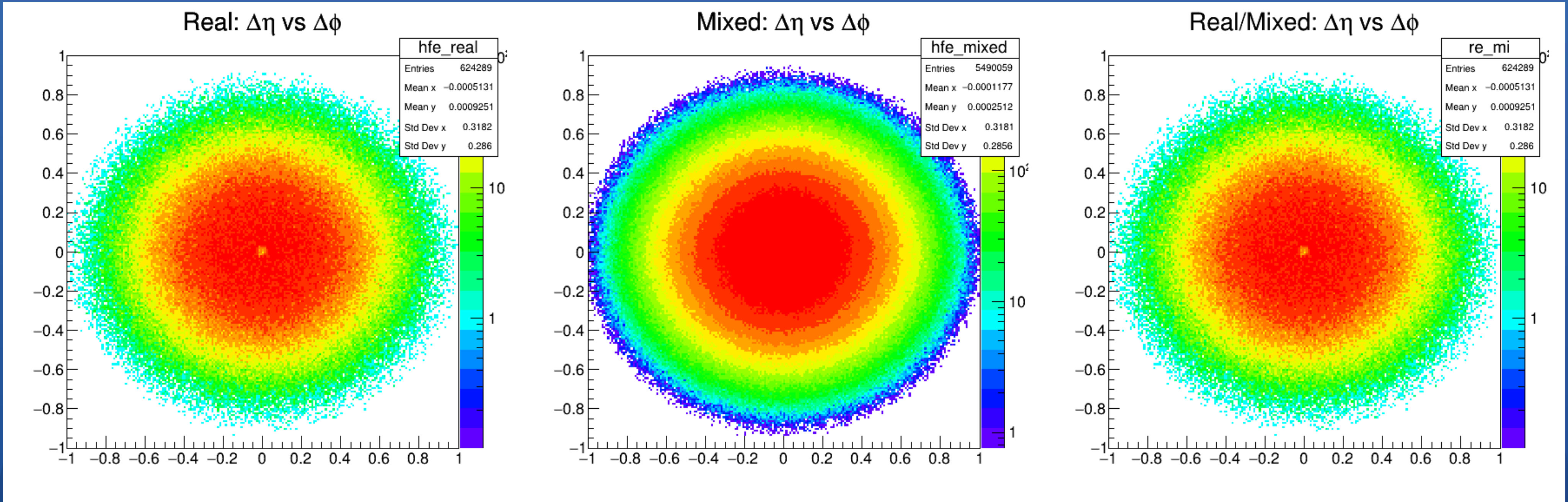
- To obtain the actual angular distance of two tracks in the transverse plane at a given cylindrical radius R the bending inside the magnetic field has to be taken into account.

$$\Delta\phi^* = \phi_1 - \phi_2 + \arcsin\left(\frac{z \cdot e \cdot B_z \cdot R}{2p_{T1}}\right) - \arcsin\left(\frac{z \cdot e \cdot B_z \cdot R}{2p_{T2}}\right)$$

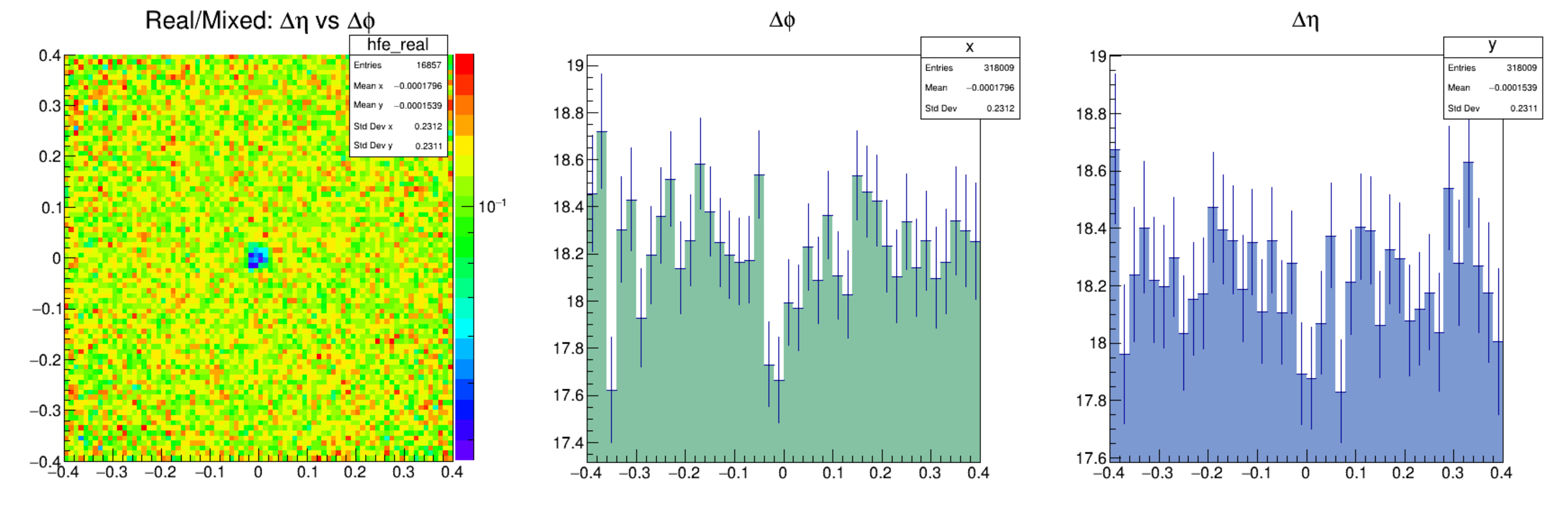
- ϕ_1 and ϕ_2 are the azimuthal angles of the tracks at the vertex, p_{T1} and p_{T2} are their transverse momenta. e stands for the elementary charge and is −0.3 in Heaviside-Lorentz units.

  B_z indicates the magnetic field in z direction.

Δη — Δφ* (no cut)

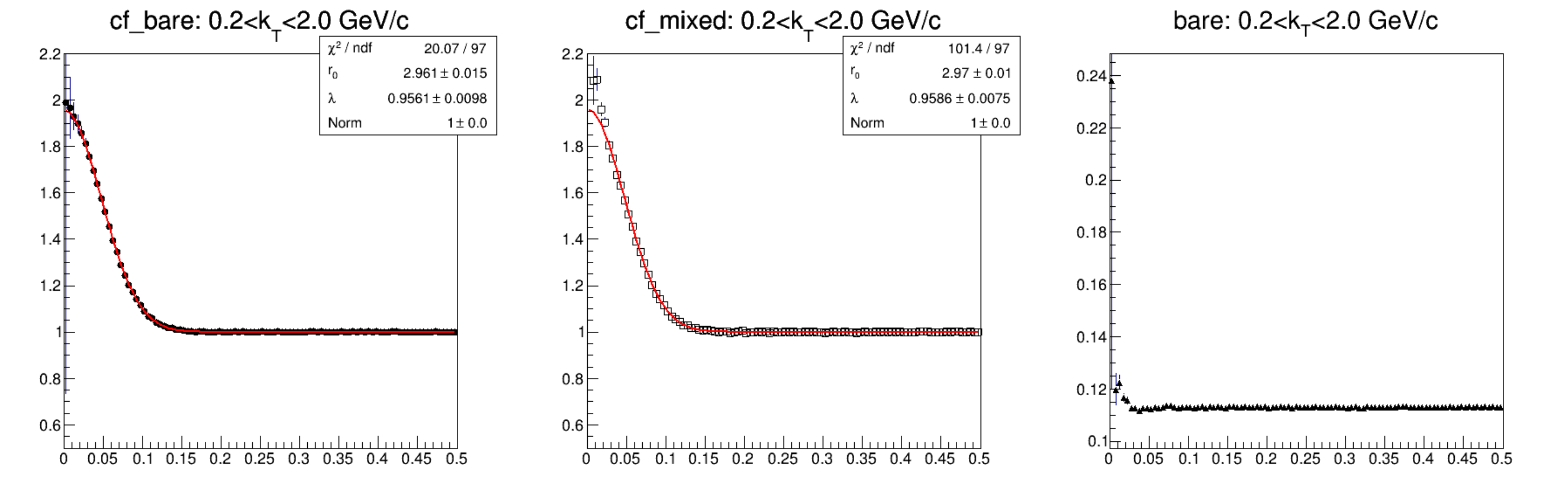

Real: Δη vs Δϕ
hfe_real
Entries 624289
Mean x −0.0005131
Mean y 0.0009251
Std Dev x 0.3182
Std Dev y 0.286
Mixed: Δη vs Δϕ
hfe_mixed
Entries 5490059
Mean x −0.0001177
Mean y 0.0002512
Std Dev x 0.3181
Std Dev y 0.2856
Real/Mixed: Δη vs Δϕ
re_mi
Entries 624289
Mean x −0.0005131
Mean y 0.0009251
Std Dev x 0.3182
Std Dev y 0.286

Δη — Δφ* (no cut)



Real/Mixed: Δη vs Δϕ
hfe_real
Entries 16857
Mean x −0.0001796
Mean y −0.0001539
Std Dev x 0.2312
Std Dev y 0.2311
Δϕ
x
Entries 318009
Mean −0.0001796
Std Dev 0.2312
Δη
y
Entries 318009
Mean −0.0001539
Std Dev 0.2311

CFs: Δη<0.04 and Δφ*<0.02



CFs: Δη<0.04 and Δφ*<0.02