Analysis Report

R.Debbe BNL

After some problems (http://www.star.bnl.gov/rt2/Ticket/Display.html?id=2384) I have been able to get StPeCMaker library to read MuDst from all runs.
I then started to generate our UPC trees and hit my disk quota in /star/data01/pwg/ (150GBytes).
In order to proceed I copied the trees I produced for run10 (P10ik) to HPSS.
I run in parallel over the run11 P11id MuDsts and run10 P10ik ones. The maximum number of Primary tracks in the selection of UPC events was lowered to 6 (not 12 as I had in the previous pass).

The new run10 (P10ik) trees are now available in /star/data01/pwg/ramdebbe/run10AuAu200Tree/ with the following names:

C4426B62478A5AED70D946A66F2CD80C_*.tree.root   11011035-11039028 (unofficial UPC_Main)
561661464594734385FFEB253B1ED57F_*.tree.root   11039046 - 110500056
72466D5AA59FD17E489268B8EE123C69_*.tree.root   11051001 - 11065059
D89BB6AC054C730AD32349A2DBBF0501_*.tree.root   11066001 - 11077018

The overall size of this new tree set is 51GB (not the previous 134GB)
These trees have tofHits and tofTracks branches.

I have also produced UPC trees from run11 P11id production, they can be found in:
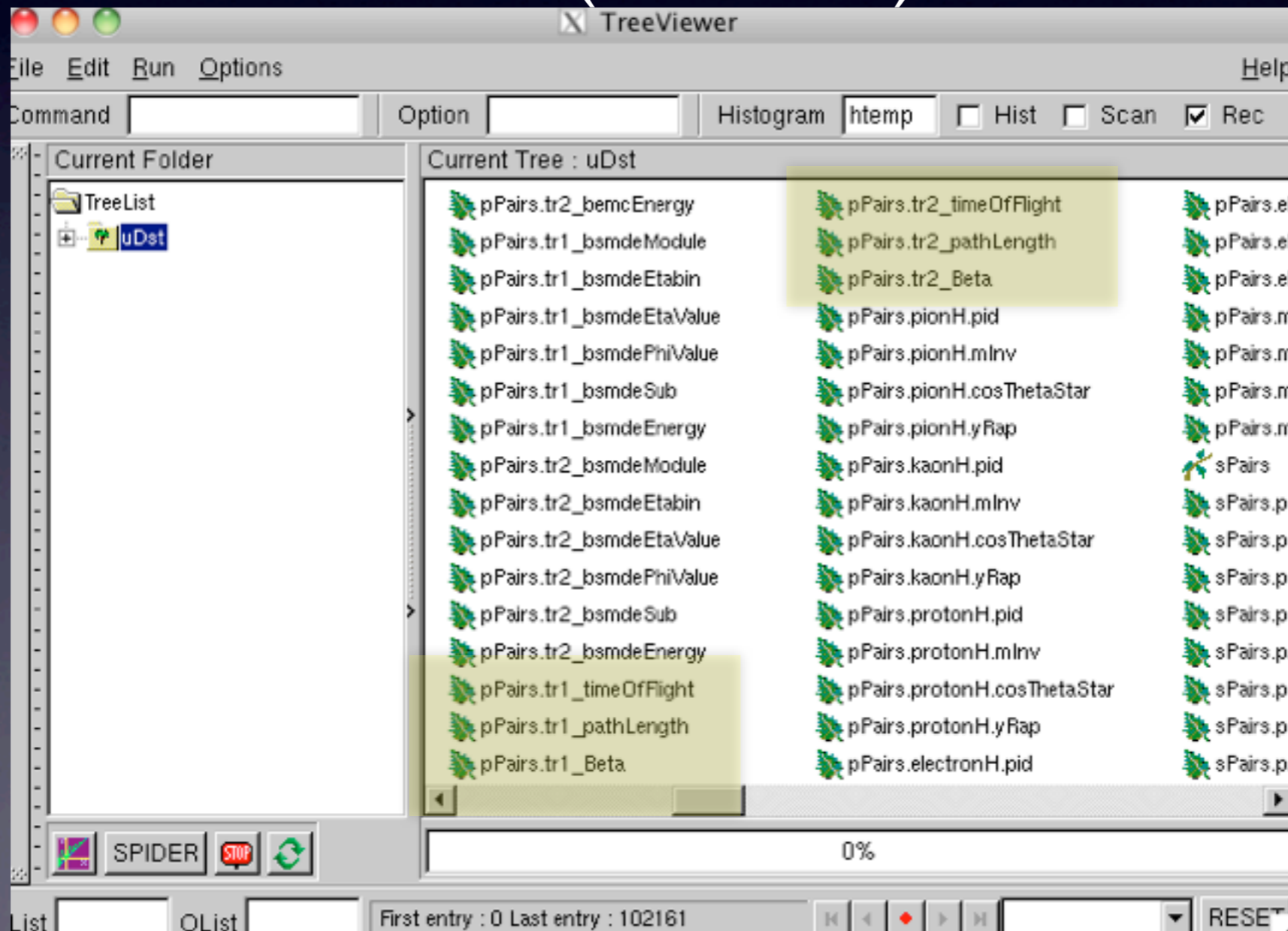/star/data01/pwg/ramdebbe/run11AuAu200/
with names:

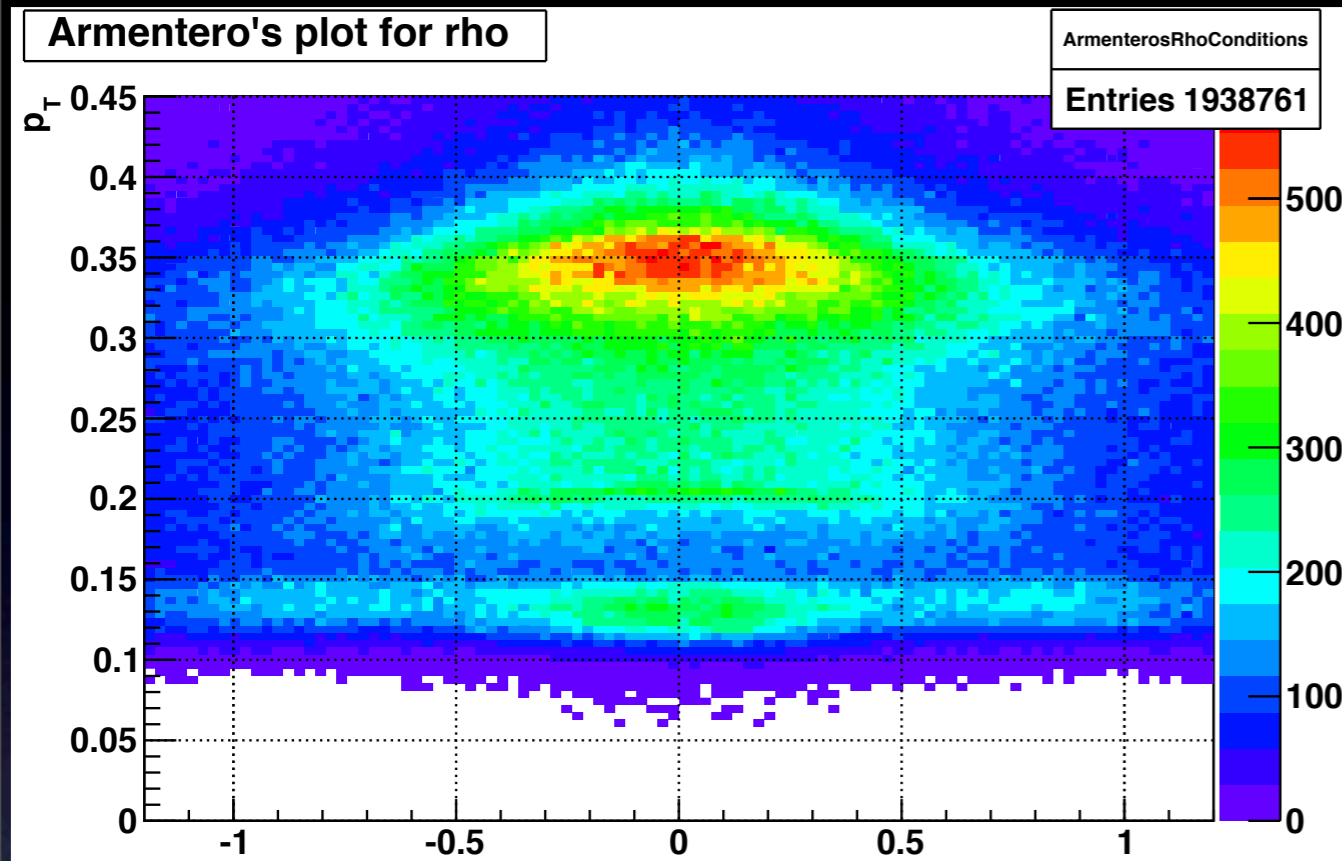|	
C439D0B685ABFA09AACBFE7EFDD6BB7D_*.tree.root	12130013 - 12145020
9CE3D78A0347941013A1A63413A49102_*.tree.root	12146004 - 12158074
E4D763853F3FB5E5259BBDC21572FA2B_*.tree.root	12159003 - 12171016

These trees do not have tofHits or tofTrack branches
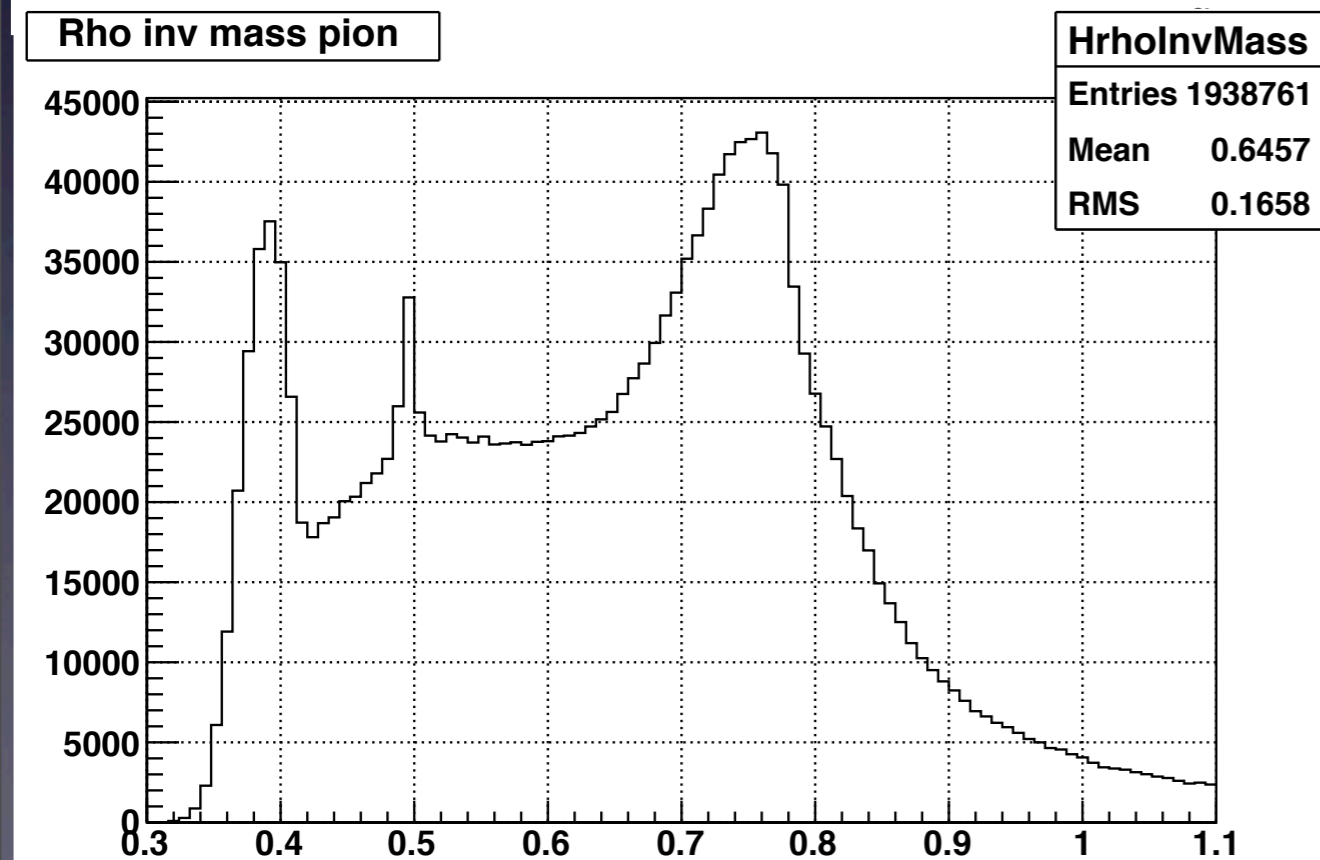The size of this dataset is ~20GB

If you are using copies of my macro to read these new trees you need to do some work to adapt to the new structure of the trees:
In every case, new information has been added to the pPairs and sPairs (not used) branches:

First look at P11id production

Armentero's plot for rho

ArmenterosRhoConditions
Entries 1938761

Rho inv mass pion

HrhoInvMass
Entries 1938761
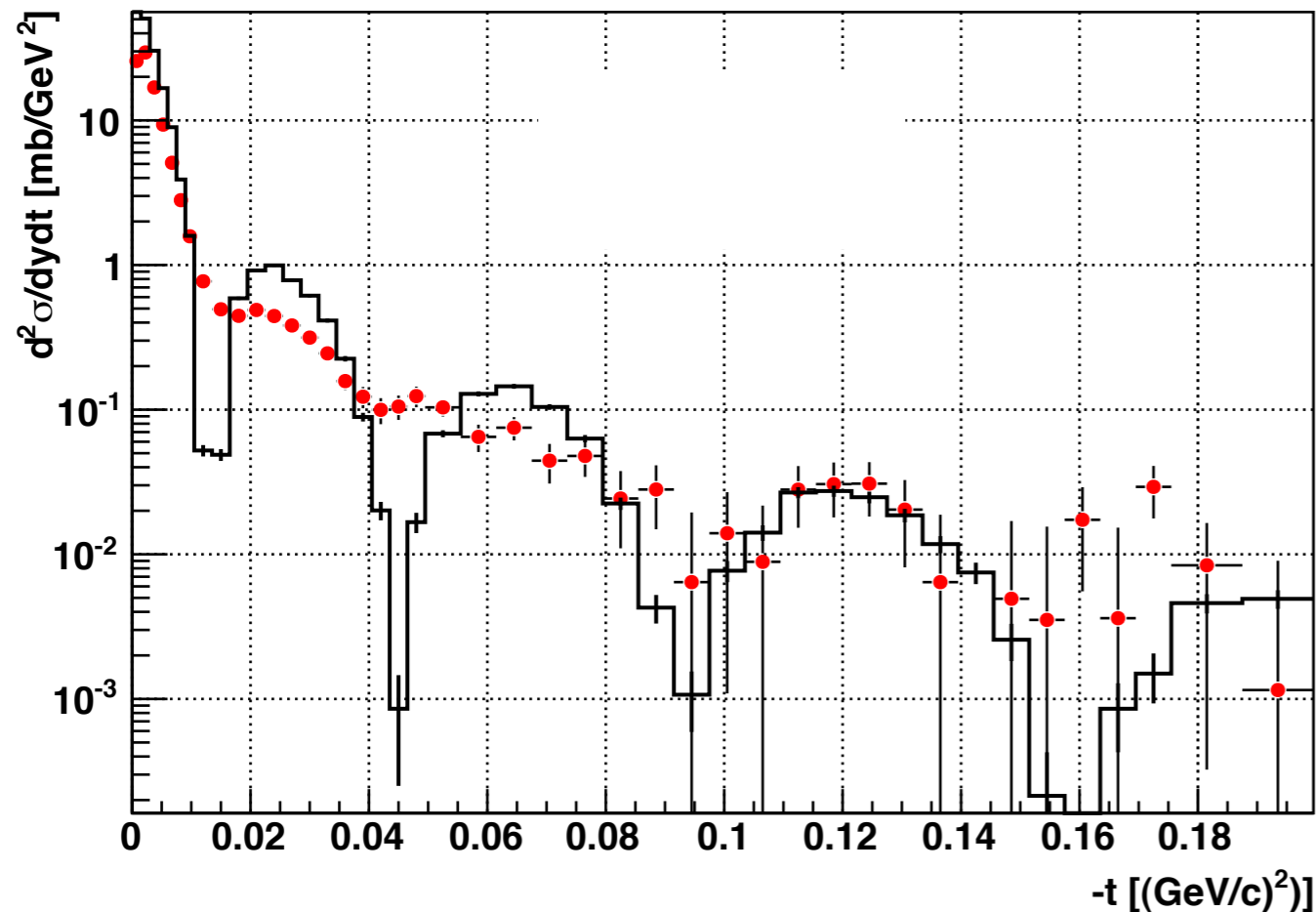Mean 0.6457
RMS 0.1658

Wed Jul 11 12:23:05 2012

The rho meson is precent "copiously?" in this first pass but the peak below 400 MeV/c^2 needs to be explained.
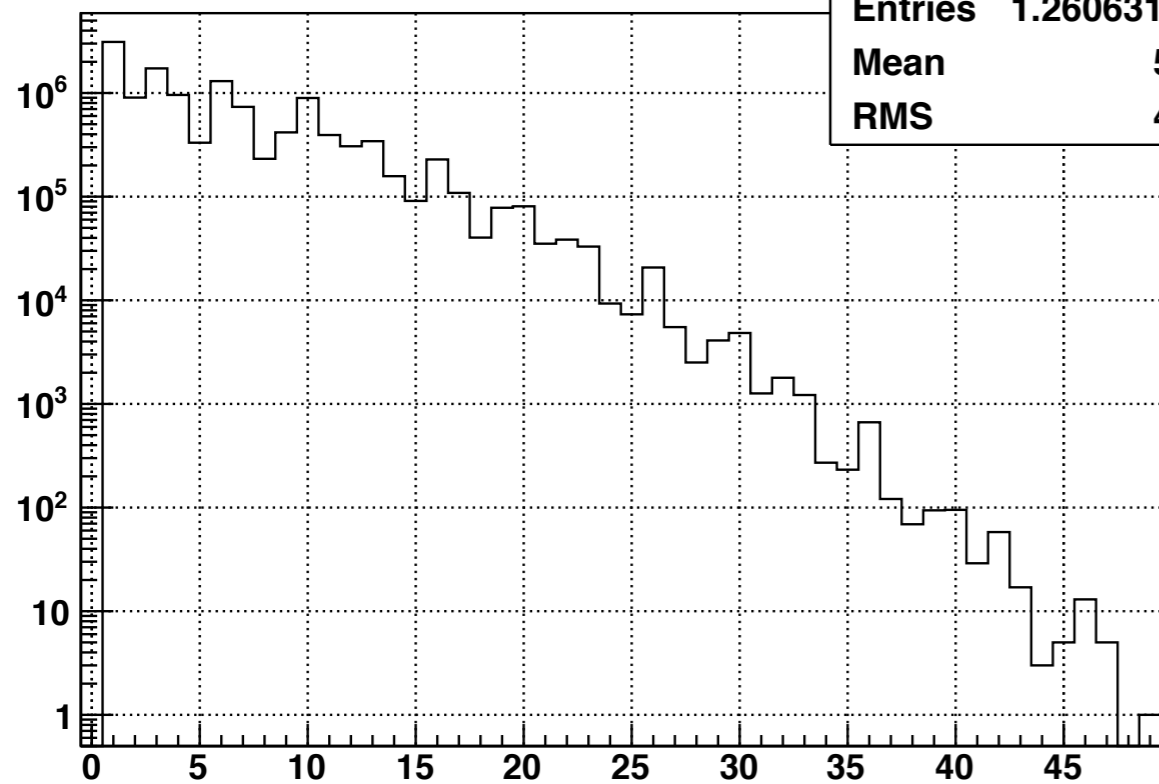
The total number of events in this production is 12.6 M. Jamie's trigger page has that number as 17M.

The diffraction pattern is present, the normalization is producing a cross section that is ~40% lower than the one obtained with run10 data.
Much more careful work is needed to reach the level of analysis similar to run 10.
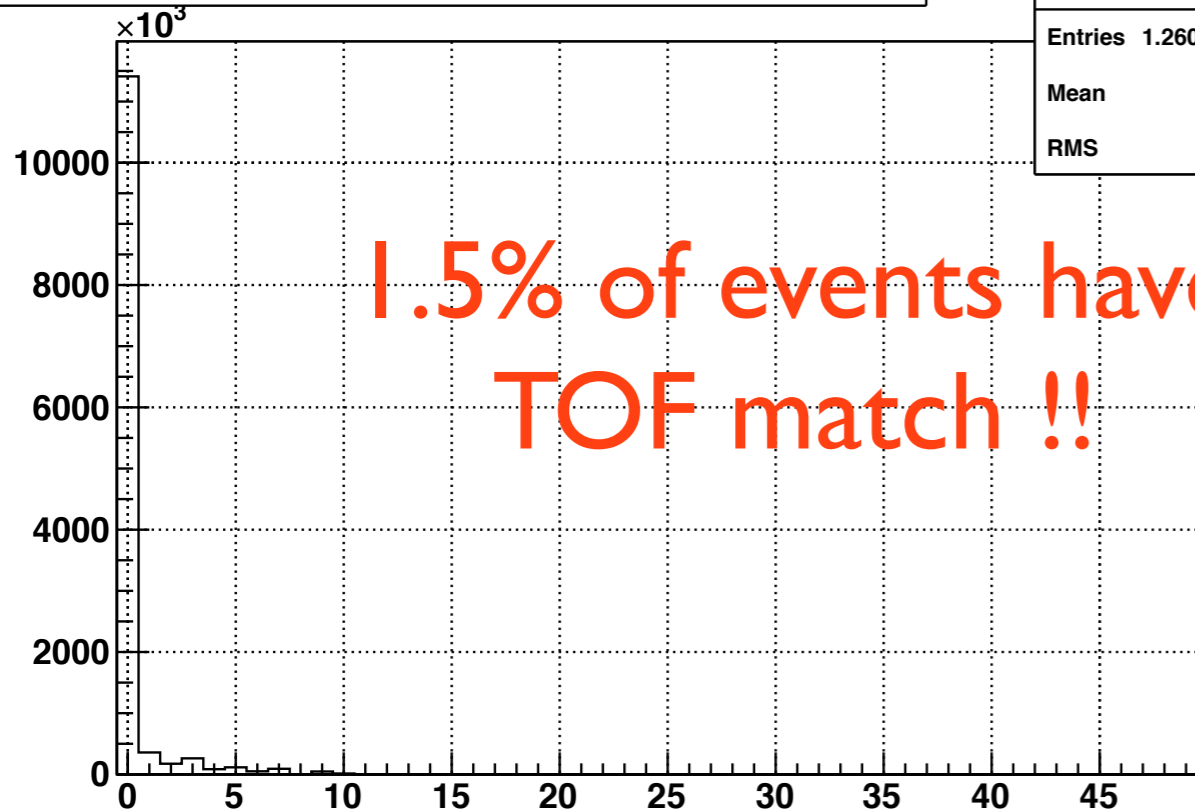
number of pairs in event

numberPairs	
Entries	1.260631e+07
Mean	5.746
RMS	4.968

Wed Jul 11 12:32:11 2012

number of pairs with TOF track (vertex link)

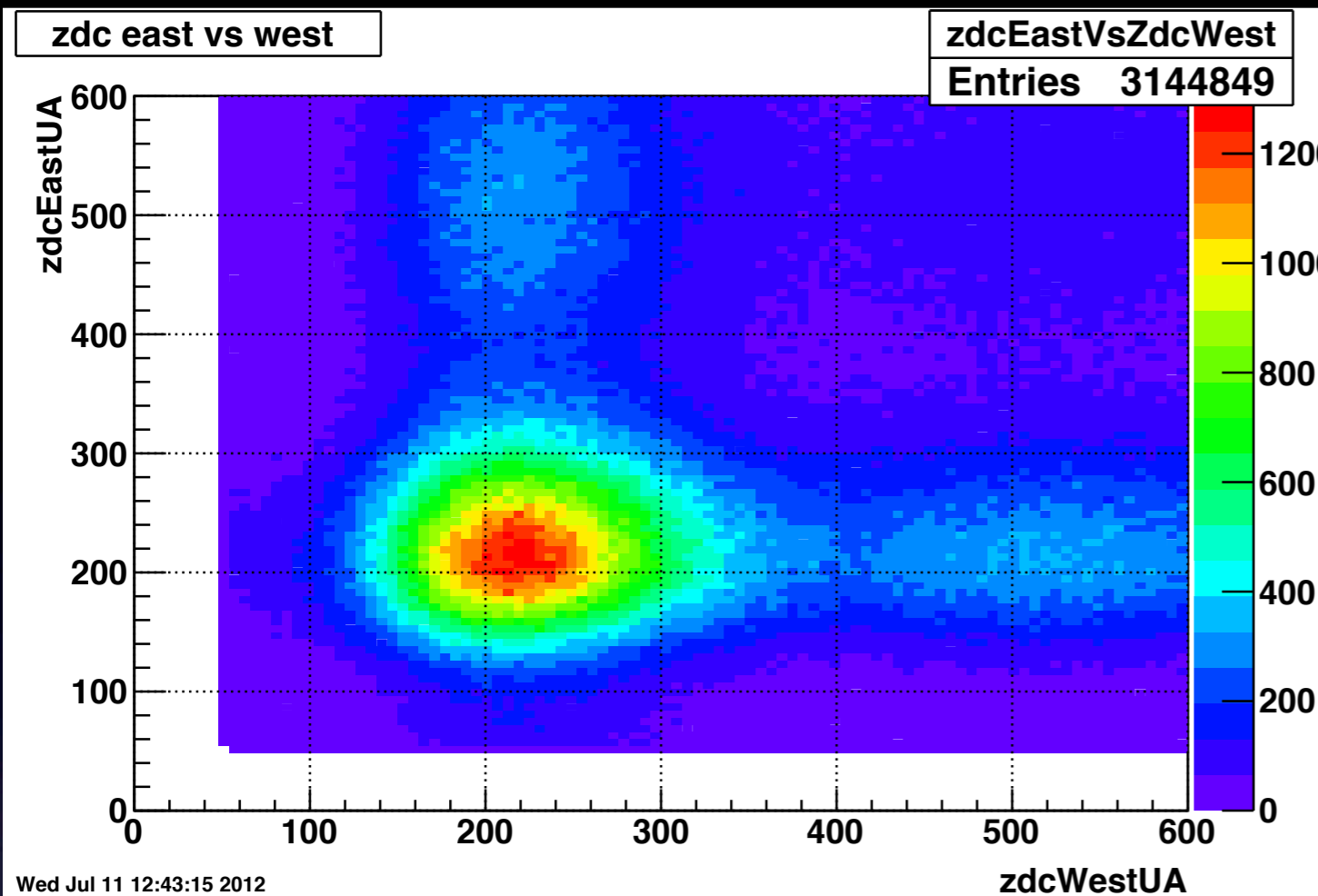| numberPairsWithTOF	
Entries	1.260631e+07
Mean	0.3106
RMS	1.196

1.5% of events have TOF match !!

Wed Jul 11 12:36:13 2012
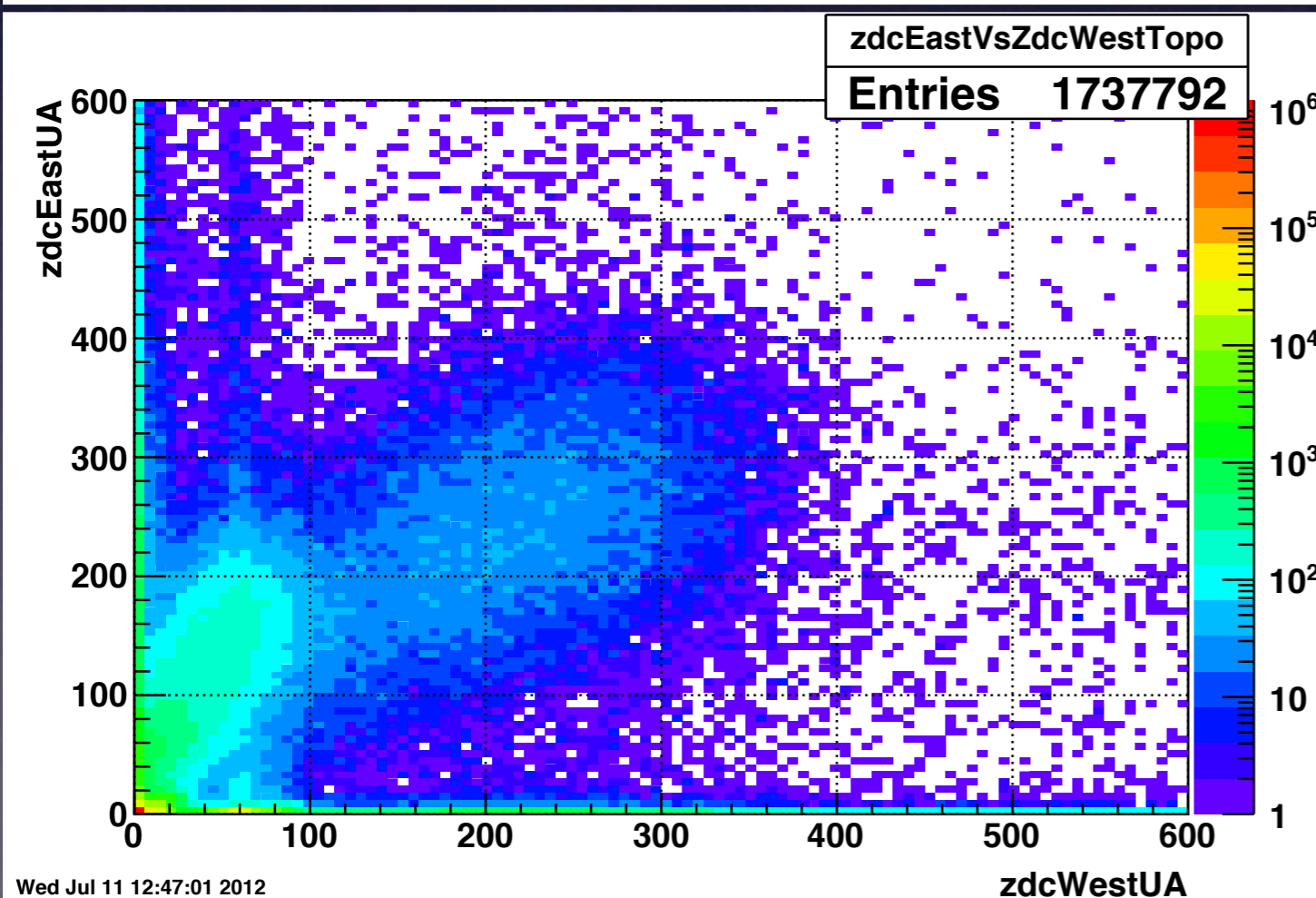
```
matchCount = 0;
for(int Pairs=0;Pairs<pPairs_;Pairs++) {

    if(pPairs_tr1_timeOfFlight[Pairs]>-10. ||
        pPairs_tr2_timeOfFlight[Pairs]>-10.){
    matchCount += 1.;
    }
}
numberPairsWithTOF->Fill(matchCount);
```
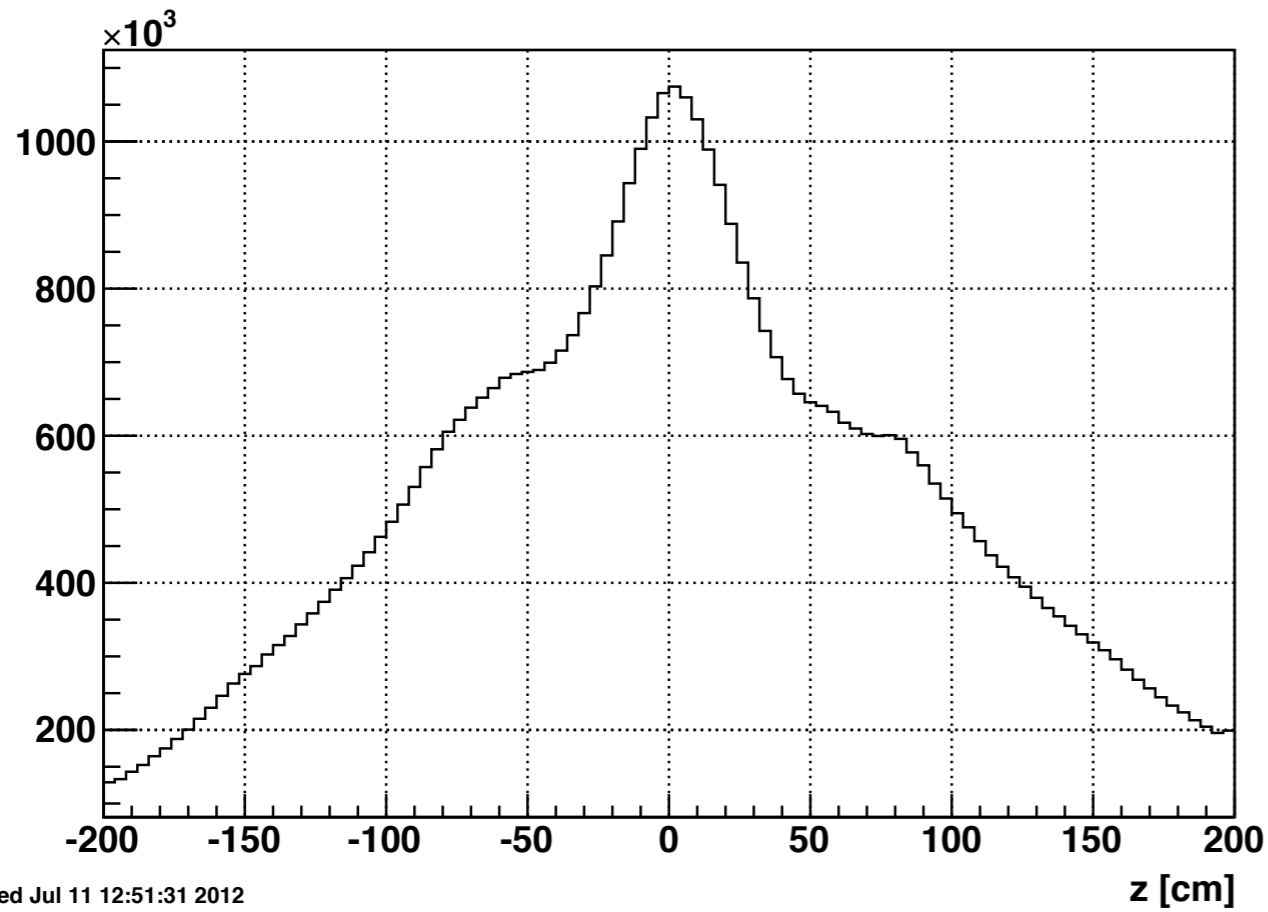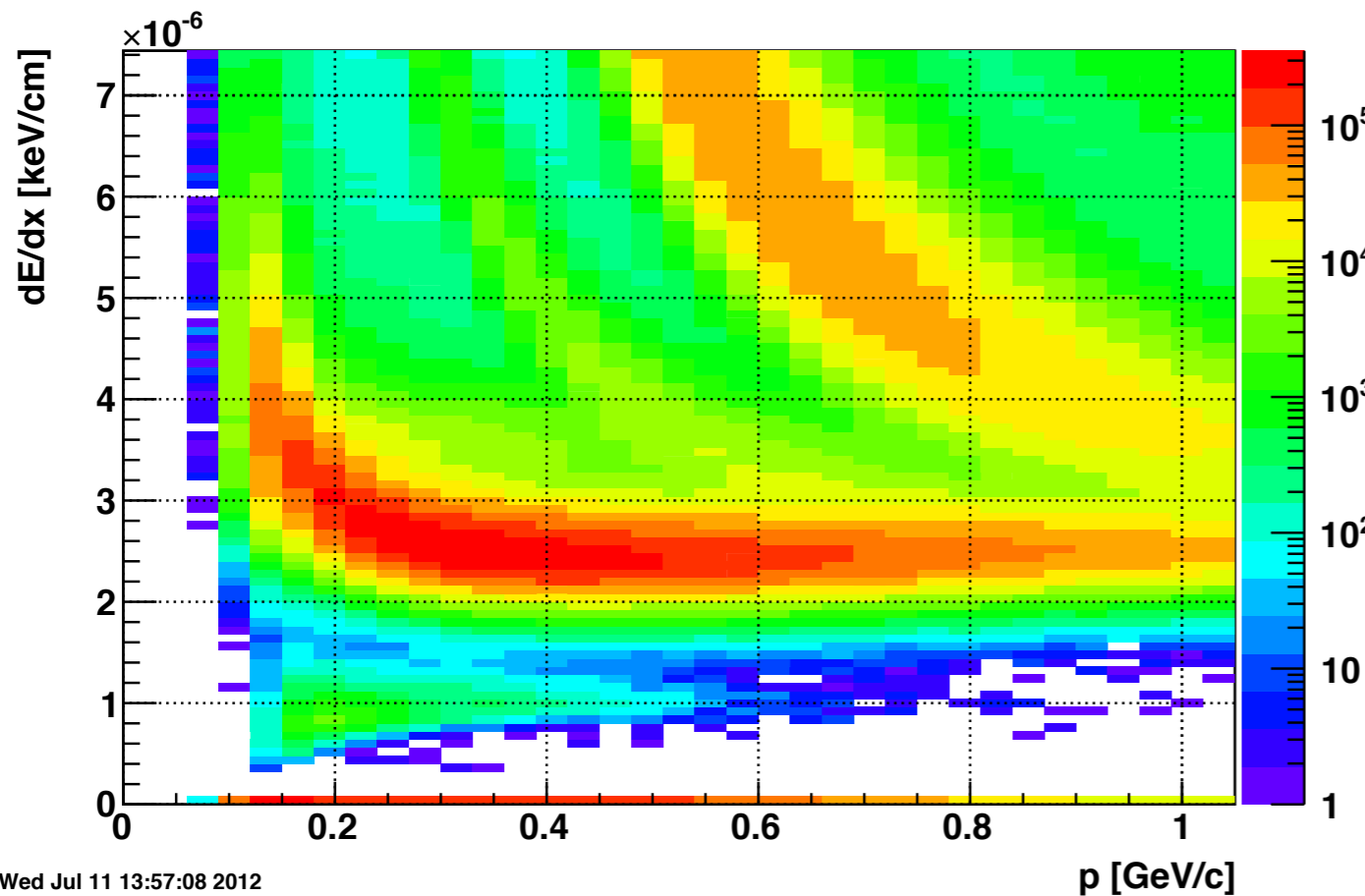
UPC_Main

UPC_Topo

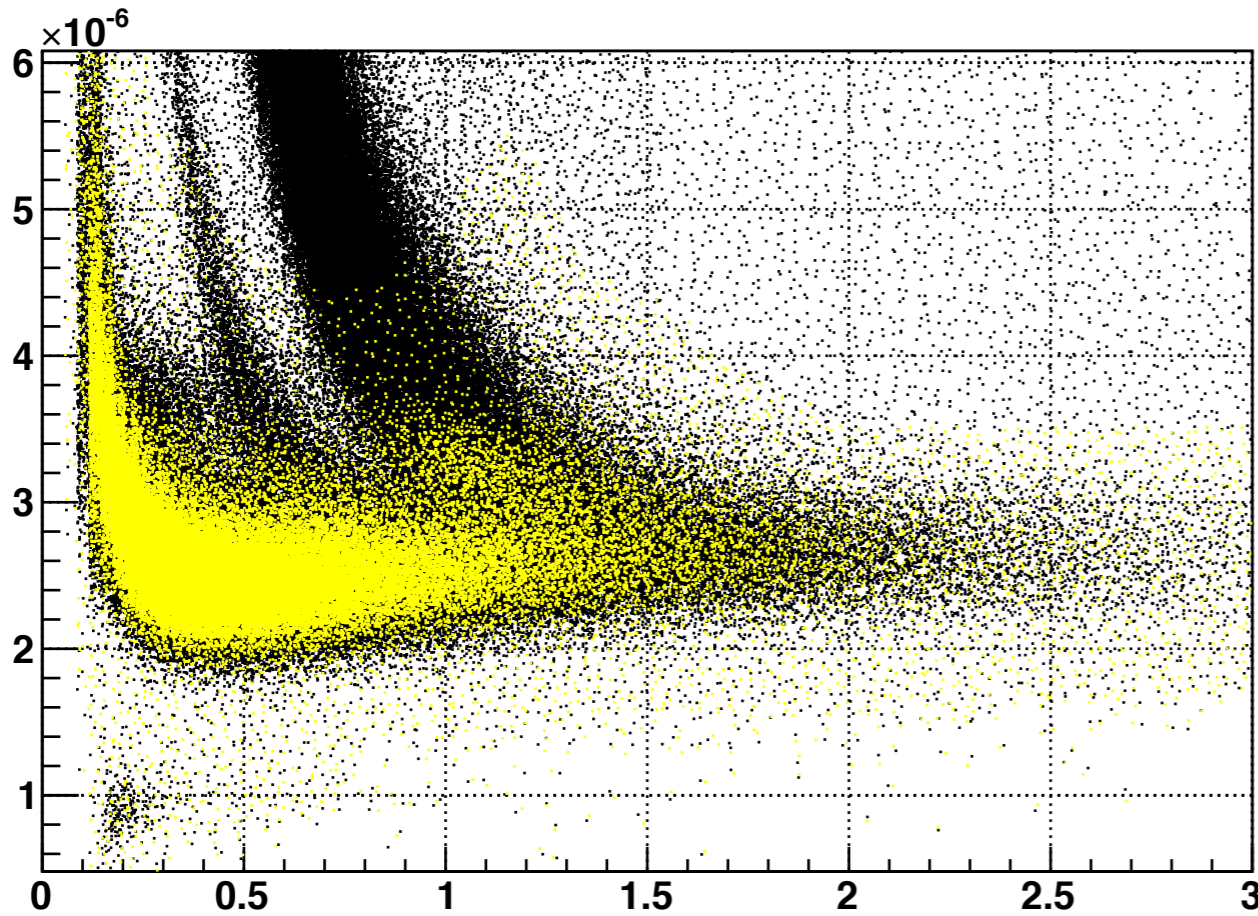The number of entries does not add up to total number of events.

PID with TPC

Yellow points are pions identified with prob>0.5 clearly it is accepting kaons and protons, may explain
low mass peak.

Black: $\pi^+\pi^-$ pair p_t .
Red: same sign π pair p_t.

In our previous analysis of run10 MuDst we had:
68% of the events without TOF hit match,
28% of events with at least one track matched to TOF.

```
for(int iPairs=0;iPairs<pPairs_;iPairs++) {  //was <nPPairs

//use events that have at least one TOF track
//and pairs that share the same vertex with the TOF track
//
// we need to loop over the tof hits and check their vertex index
haveAmatch = 0;
int whichTrack = 0;
for(Int_t tf =0;tf<tofTracks_;tf++) {
  TOFvertexIndex = tofTracks_mVertexIndex[tf];
 if(pPairs_tr1_vertexIndex[iPairs]==TOFvertexIndex){
    haveAmatch = tf+1;
    whichTrack = 1;
    break;
  }
 if(pPairs_tr2_vertexIndex[iPairs]==TOFvertexIndex){
    haveAmatch = tf+1;
    whichTrack = 2;
    break;
  }
}
if(pPairs_tr1_vertexIndex[iPairs]!=TOFvertexIndex) continue;
if(!haveAmatch) continue;
```

For the run11 output tree version without TOF branches I use a scheme that I thought would produce the same results but I find only 1.5% of the events have tracks matched to TOF hits.

The fill method of StPeCPair has two instances of StMuTrack muTrack1 and muTrack2, I make use of:

```
StMuBTofPidTraits mBTofPidTraits_1 = muTrack1->btofPidTraits();
StMuBTofPidTraits mBTofPidTraits_2 = muTrack2->btofPidTraits();
```

To fill new variables in the pPairs branch:

```
tr1_timeOfFlight = mBTofPidTraits_1.timeOfFlight();
tr1_pathLength   = mBTofPidTraits_1.pathLength();
tr1_Beta         = mBTofPidTraits_1.beta();
tr2_timeOfFlight = mBTofPidTraits_2.timeOfFlight();
tr2_pathLength   = mBTofPidTraits_2.pathLength();
tr2_Beta         = mBTofPidTraits_2.beta();
```

I should first make sure that the StMuTracks have the BTofPidTraits.

Things to do:
1) Read the new run10 UPC trees and make sure I do get the same results as before.
2) Start to work on trigger efficiency with ZDC_monitor triggers.
3) Prepare to finalize the Rho embedding project.
4) Setup tools to extract luminosity with different vertex conditions.
5) Continue debugging the run11 tree.
6) In parallel to all above, write WWND proceedings.