Analysis Train update: evPID wagon

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evPID wagon and MpdTrack class

- New wagon has been committed to MpdRoot: evPID (mpdroot/physics/evPID)
- MpdTrack class has been updated to include new variables for each track (mpdroot/core/mpdBase/MpdTrack.h)
- evPID wagon calculates sigmalized variables for each MpdTrack
- Each successive wagon in the Train can use sigmalized variables for free:
  - ✓ DCAs:
    mpdtrack->GetNSigmaDCAx(), mpdtrack->GetNSigmaDCAy(), mpdtrack->GetNSigmaDCAz()
  - ✓ TPC-PID:
    mpdtrack -> GetTPCNSigma(kEl) //kEl, kPi, kK, kP, kDeutron, kTriton, kHe3, kHe4
  - ✓ TOF-matching:
    mpdtrack->GetTofDphiSigma(), mpdtrack->GetTofDzSigma()
  - ✓ TOF-PID:
    mpdtrack -> GetTOFNSigma(kEl) //kEl, kPi, kK, kP, kDeutron, kTriton, kHe3, kHe4
  - ✓ EMC-matching:
    mpdtrack->GetECALDphiSigma(), mpdtrack->GetECALDzSigma()
  - ✓ ECAL-PID:
    mpdtrack->GetEp() // uncorrected energy
    mpdtrack->GetEt() // time-of-flight
    mpdtrack->GetEl() // track length

PairKK wagon

- Updated pairKK wagon (mpdroot/physics/pairKK):
  - ✓ moved all parameterizations for DCA/TPC/TOF to evPID wagon (see previous presentation for details)
  - ✓ use sigmalized variables from MpdTrack class for selection of PIDed hadrons
- Use mpdroot/physics/pairKK/macros/RunAnalyses.C macro as an example:
  - ✓ root –b –q RunAnalyses.C

RunAnalyses.C 1.11 KiB

```
bool CheckFileExist(TString fileName){
    gSystem->ExpandPathName(fileName);
    if (gSystem->AccessPathName(fileName.Data()) == true)
    {
        cout<<endl<<"no specified file: "<<fileName<<endl;
        return false;
    }

    return true;
}


void RunAnalyses(int nEvents = -1, TString inFileList = "list.txt"){

  //gROOT->LoadMacro("mpdloadlibs.C");
  //gROOT->ProcessLine("mpdloadlibs()");

   gSystem->Load("libZdc.so") ;
   gSystem->Load("libEmc.so") ;
   gSystem->Load("libMpdPhotons.so") ;
   gSystem->Load("libMpdPhysics.so") ;

   MpdAnalysisManager man("ManagerAnal", nEvents) ;
   if (!CheckFileExist(inFileList)) return;
   man.InputFileList(inFileList) ;
   man.ReadBranches("*") ;
   man.SetOutput("histos.root") ;

   MpdCentralityAll pCentr("pCentr","pCentr") ;
   man.AddTask(&pCentr) ;

   MpdEventPlaneAll pEP("pEP","pEP") ;
   man.AddTask(&pEP) ;

   MpdTrackPidMaker pPID("pPID","pPID") ;
   man.AddTask(&pPID) ;

//   MpdConvPi0 pDef("pi0Def","ConvDef") ; //name, parametes file
//   man.AddTask(&pDef) ;

   MpdPairKK pKK("pKK","pKK") ;
   man.AddTask(&pKK) ;

   man.Process() ;

}
```

Current limitations (16.05.2023)

- EMCAL matching and variables are defined for tracks identified as electrons within ±4 σ in the TPC
  → can be extended to other tracks in the expense of slower performance
- TOF matching variables are optional, one can continue to use TOF flag for matchings

Conclusions

- Sigmalized variables are available for all wagons in the Analysis Train
- The evPID wagon will be updated later to include PID for d/t/^{3}He/^{4}He
- Starting a new analysis has never been easier → all needed information is available for each track
- Use of MpdTrack variables for track selections is not obligatory, but desirable

Please report any problems

BACKUP