

Z->Mu Mu

Group Meeting

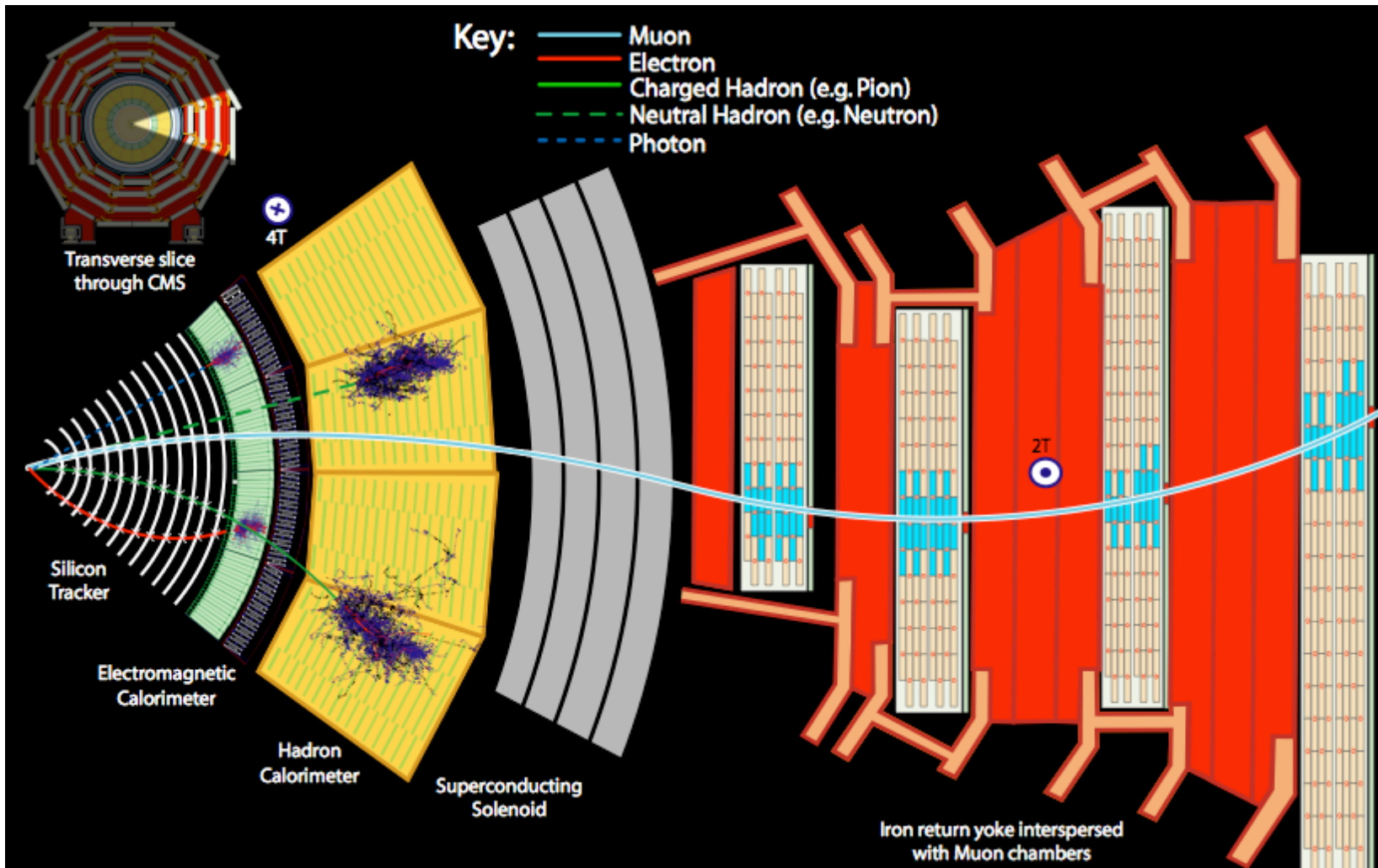
Jorge Robles

Why?

- To have code running for pp collisions since HI collisions are more than a year away
- To create a baseline to compare to $Z \rightarrow qq\bar{q}$,
 - Muons not affected by QGP

Z^0

- Neutral
- Mass 91.1876 ± 0.0021 GeV
- $\Gamma_{\text{Total}} = 2.4952 \pm 0.0023$ GeV
- $\Gamma(e^+e^-) / \Gamma_{\text{Total}} = 3.363 \pm 0.004\%$
- $\Gamma(\mu^+\mu^-) / \Gamma_{\text{Total}} = 3.366 \pm 0.007\%$



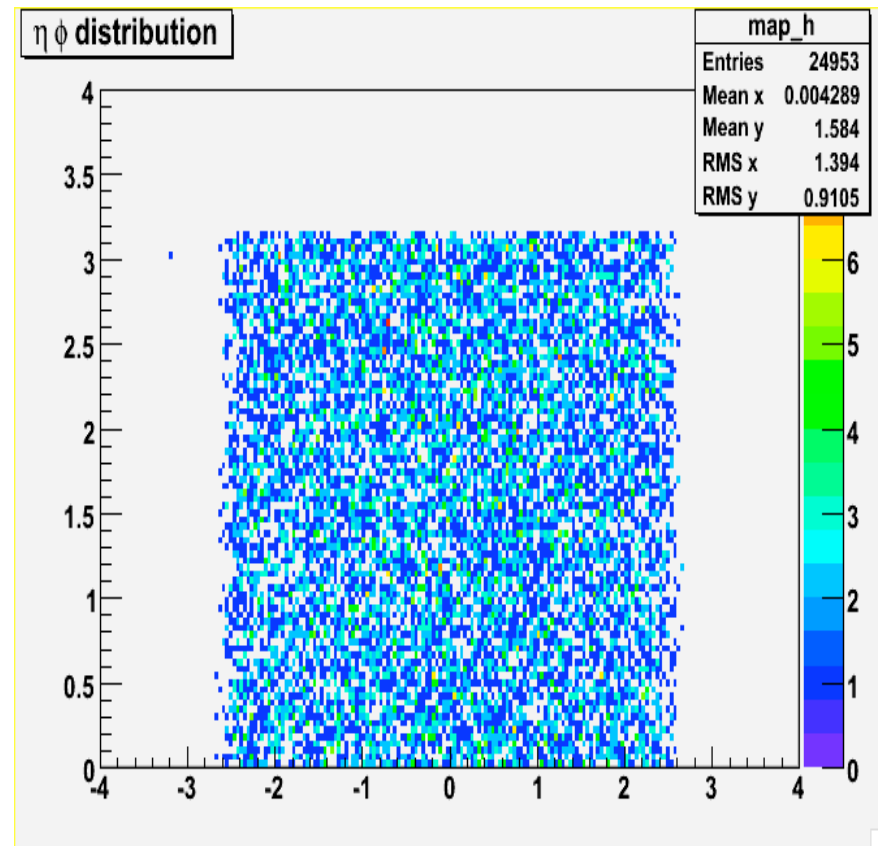
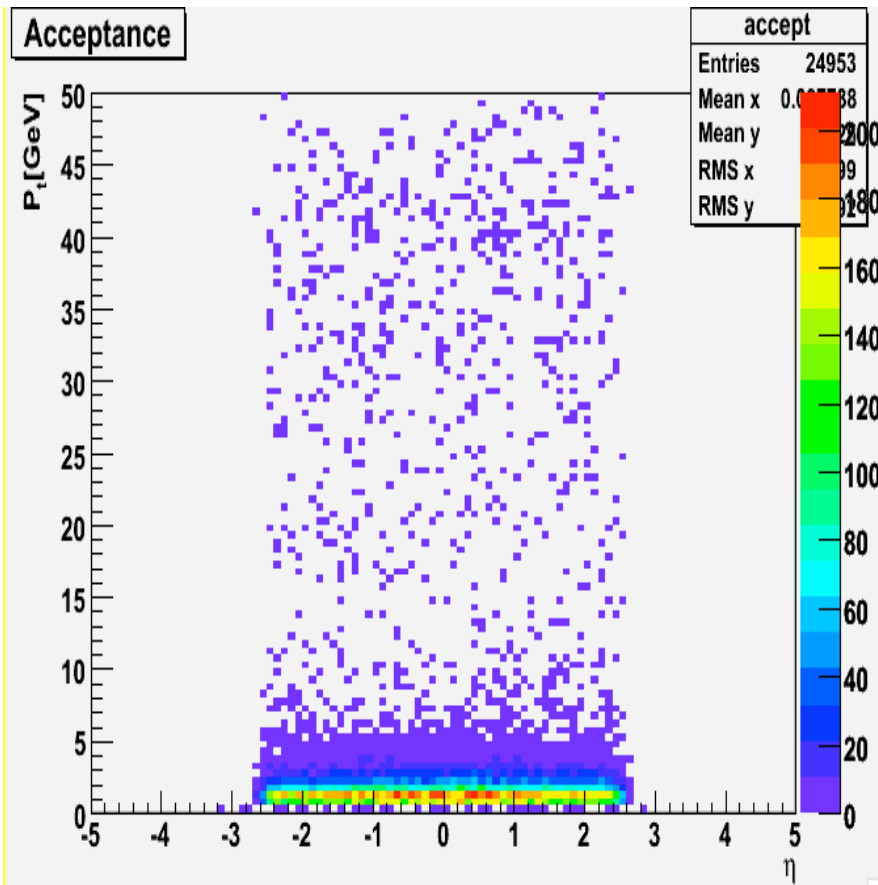
Pythia

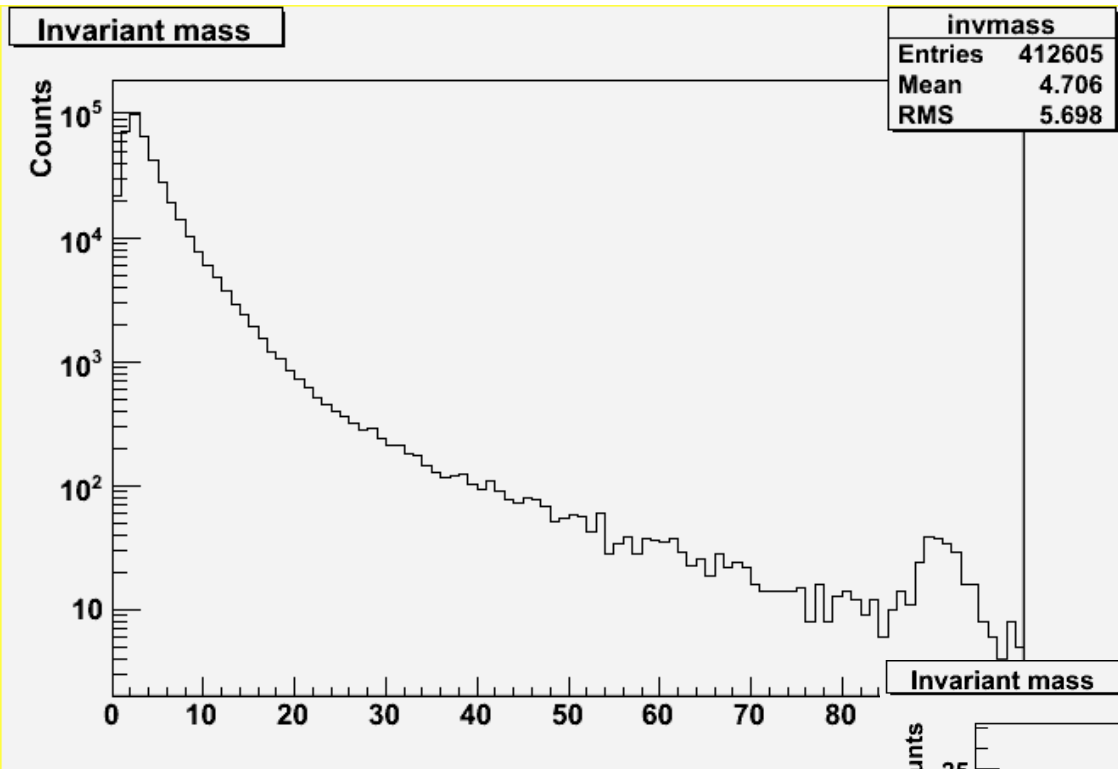
- vstring processParameters = {
- "MSEL=0 !User defined processes",
- "MSUB(1)=1 !Incl Z0/gamma* production",
- "MSTP(43)=2 !Only Z0",
- "MDME(174,1)=0 !Z decay into d dbar",
- "MDME(175,1)=0 !Z decay into u ubar",
- "MDME(176,1)=0 !Z decay into s sbar",
- "MDME(177,1)=0 !Z decay into c cbar",
- "MDME(178,1)=0 !Z decay into b bbar",
- "MDME(179,1)=0 !Z decay into t tbar",
- "MDME(182,1)=0 !Z decay into e- e+",
- "MDME(183,1)=0 !Z decay into nu_e nu_ebar",
- "MDME(184,1)=1 !Z decay into mu- mu+",
- "MDME(185,1)=0 !Z decay into nu_mu nu_mubar",
- "MDME(186,1)=0 !Z decay into tau- tau+",
- "MDME(187,1)=0 !Z decay into nu_tau nu_taubar"
- }

Data Formats

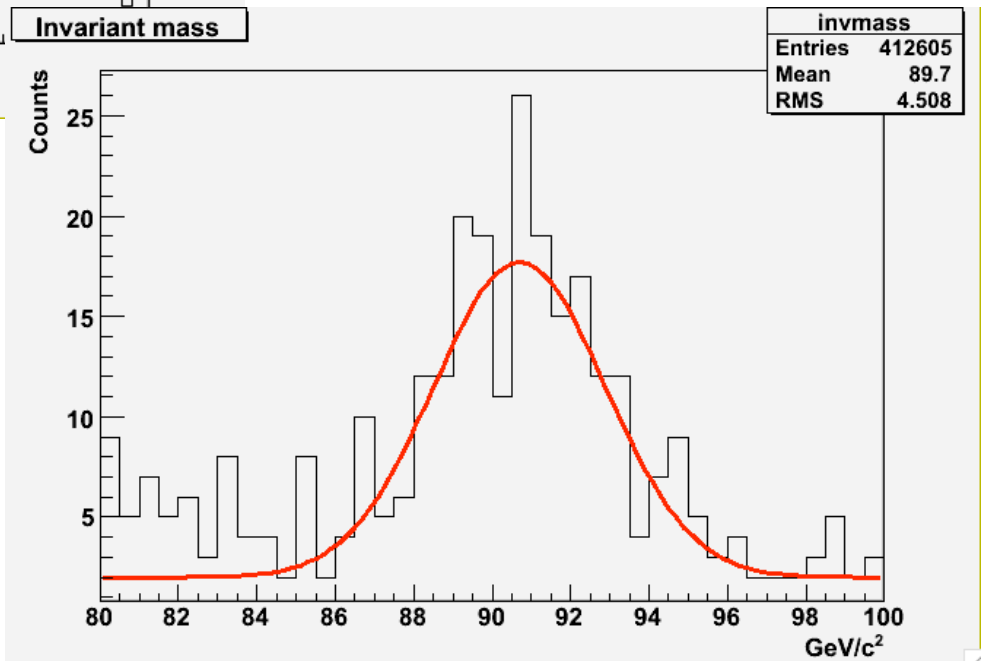
- HepMC
 - Monte Carlo Generated particles using FastSim
- RECO
 - Reconstructed objects (tracks, vertices, jets, electrons, muons, etc.) and reconstructed hits/clusters
 - Output from Tier-0

Reco tracks



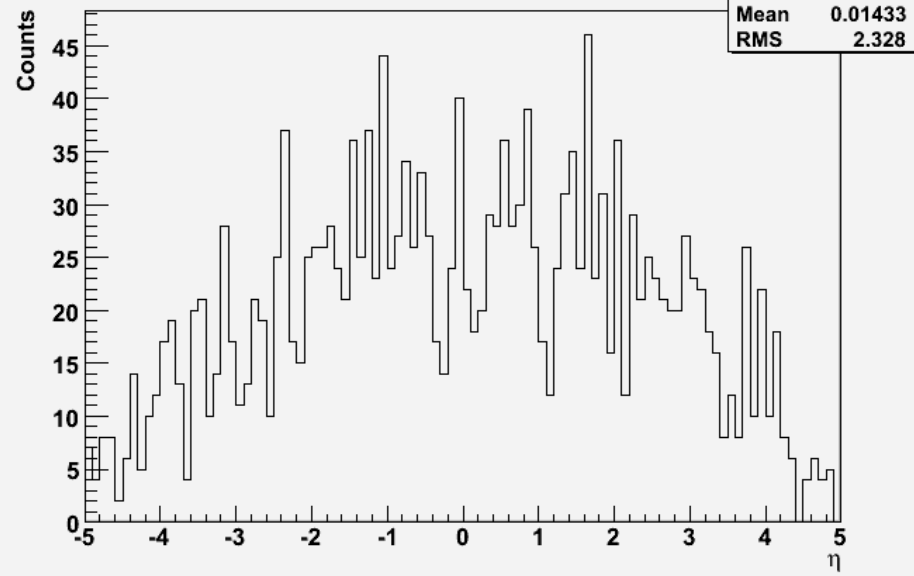


All Tracks



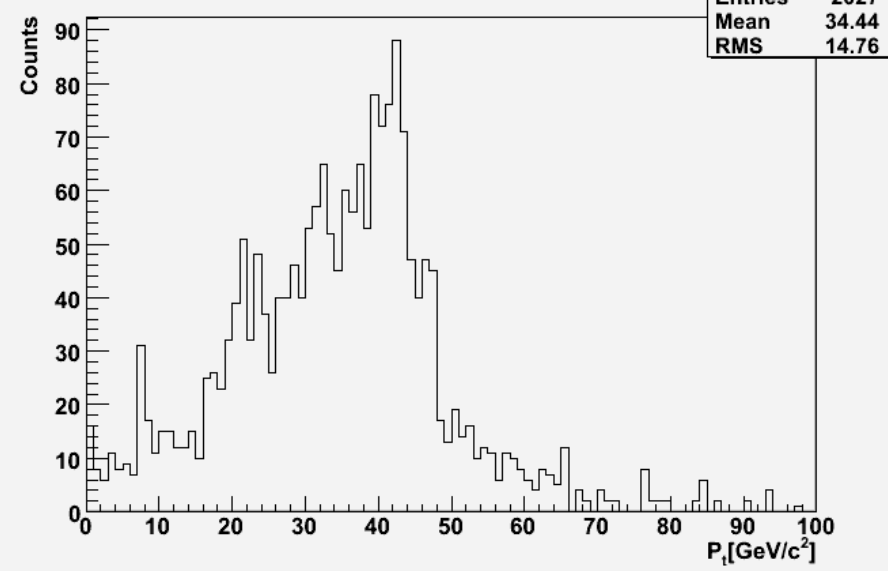
- Inetgral ~168
- From 500 events

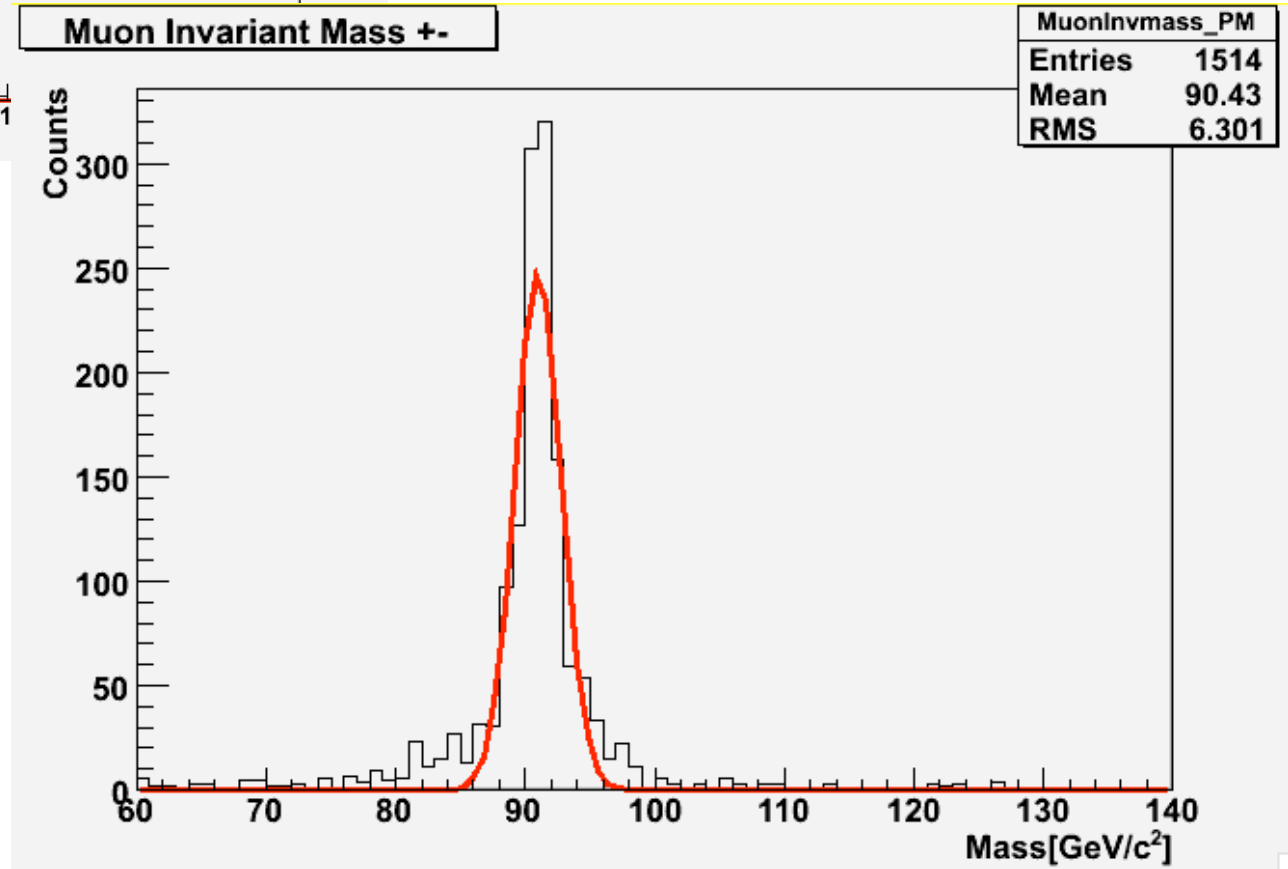
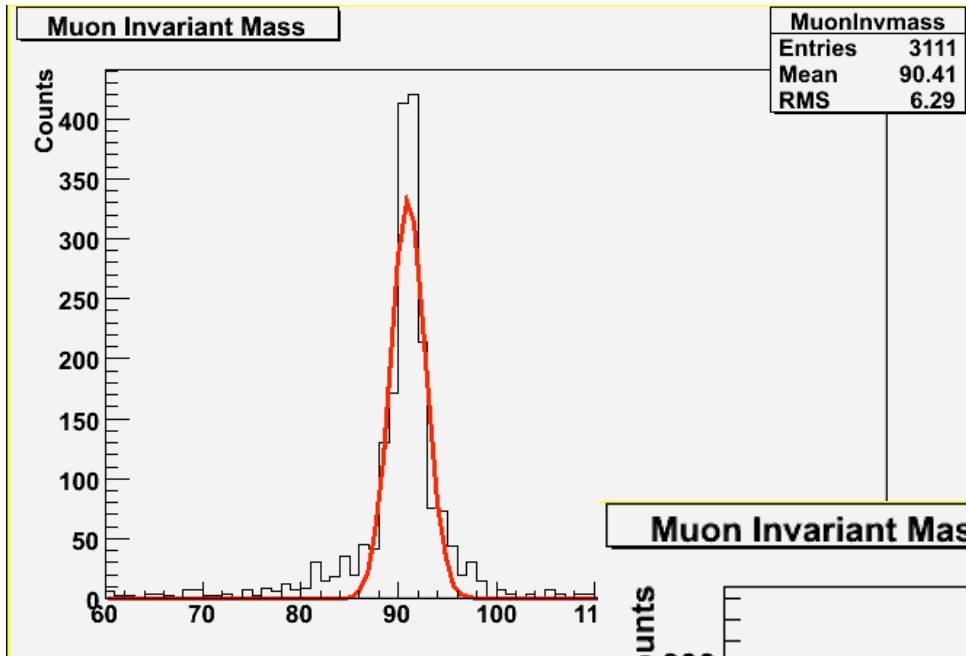
η Muons MC



HepMC Muons *using Pdg_id()

P_t of Muons MC





Current State

- from /afs/cern.ch/cms/sw/slc4_ia32_gcc345/cms/cmssw/CMSSW_1_7_5/lib/slc4_ia32_gcc345/libFWCoreFramework.so
- #18 0xf7ed8e30 in edm::Schedule::runTriggerPaths<edm::EventPrincipal> ()
- from /afs/cern.ch/cms/sw/slc4_ia32_gcc345/cms/cmssw/CMSSW_1_7_5/lib/slc4_ia32_gcc345/libFWCoreFramework.so
- #19 0xf7ed9051 in edm::Schedule::runOneEvent<edm::EventPrincipal> ()
- from /afs/cern.ch/cms/sw/slc4_ia32_gcc345/cms/cmssw/CMSSW_1_7_5/lib/slc4_ia32_gcc345/libFWCoreFramework.so
- #20 0xf7eb4233 in edm::EventProcessor::procOneEvent ()
- from /afs/cern.ch/cms/sw/slc4_ia32_gcc345/cms/cmssw/CMSSW_1_7_5/lib/slc4_ia32_gcc345/libFWCoreFramework.so
- #21 0xf7eb4c42 in edm::EventProcessor::doOneEvent ()
- from /afs/cern.ch/cms/sw/slc4_ia32_gcc345/cms/cmssw/CMSSW_1_7_5/lib/slc4_ia32_gcc345/libFWCoreFramework.so
- #22 0xf7eb53f5 in edm::EventProcessor::processEvents ()
- from /afs/cern.ch/cms/sw/slc4_ia32_gcc345/cms/cmssw/CMSSW_1_7_5/lib/slc4_ia32_gcc345/libFWCoreFramework.so
- #23 0xf7eb57a9 in edm::EventProcessor::processLumis ()
- from /afs/cern.ch/cms/sw/slc4_ia32_gcc345/cms/cmssw/CMSSW_1_7_5/lib/slc4_ia32_gcc345/libFWCoreFramework.so
- #24 0xf7eb5e92 in edm::EventProcessor::processRuns ()
- from /afs/cern.ch/cms/sw/slc4_ia32_gcc345/cms/cmssw/CMSSW_1_7_5/lib/slc4_ia32_gcc345/libFWCoreFramework.so
- #25 0xf7eb6472 in edm::EventProcessor::run ()
- from /afs/cern.ch/cms/sw/slc4_ia32_gcc345/cms/cmssw/CMSSW_1_7_5/lib/slc4_ia32_gcc345/libFWCoreFramework.so
- #26 0x080506bf in main ()
- Segmentation fault

To do...

- In RECO: get the `pdg_id` to only look at muons and make sure that they come from a Z^0 decay
- Get the rapidity of Z^0
- Migrate code to `CMSSW_2_1_0`
- Use larger data samples