Measurement of the J/ψ in pp collisions at √s=7 TeV with the CMS experiment

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CMS Meeting @ DESY
6th September 2010

Overview

- Introduction
- Running jobs using CRAB
- Distributions for electrons
- Electron ID in CMS
- Invariant mass of J/ψ
- Summary/Outlook

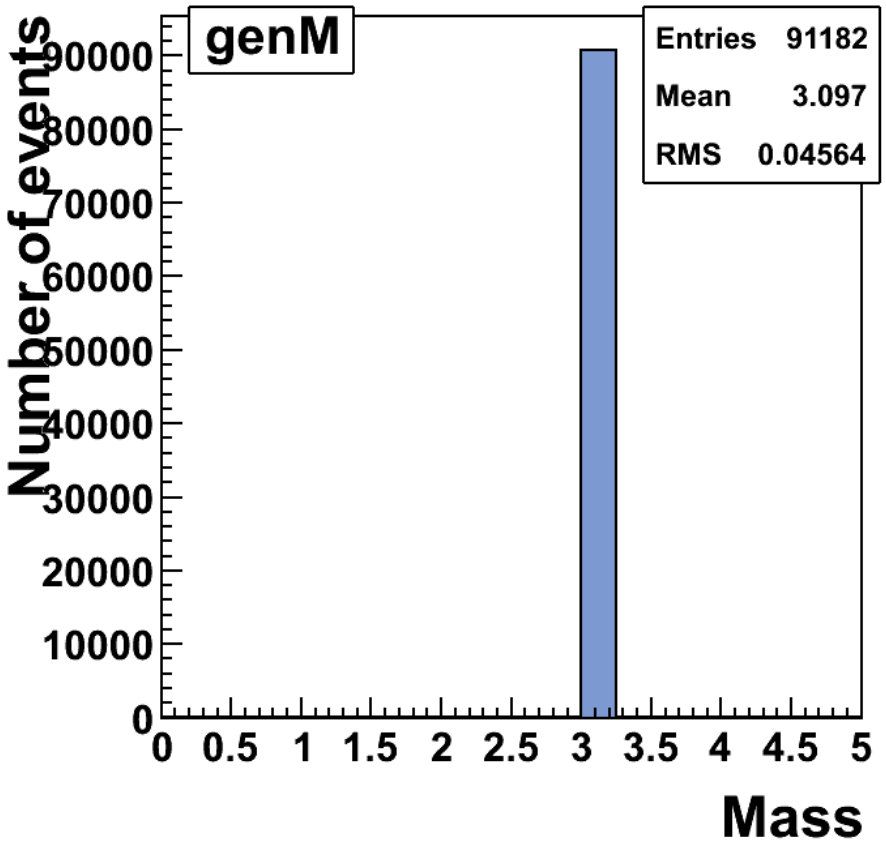
J/ψ(1S) decay modes

J/ψ -> hadrons
J/ψ -> virtual γ -> hadrons
J/ψ -> $\mu^+\mu^-$
J/ψ -> e^+e^-

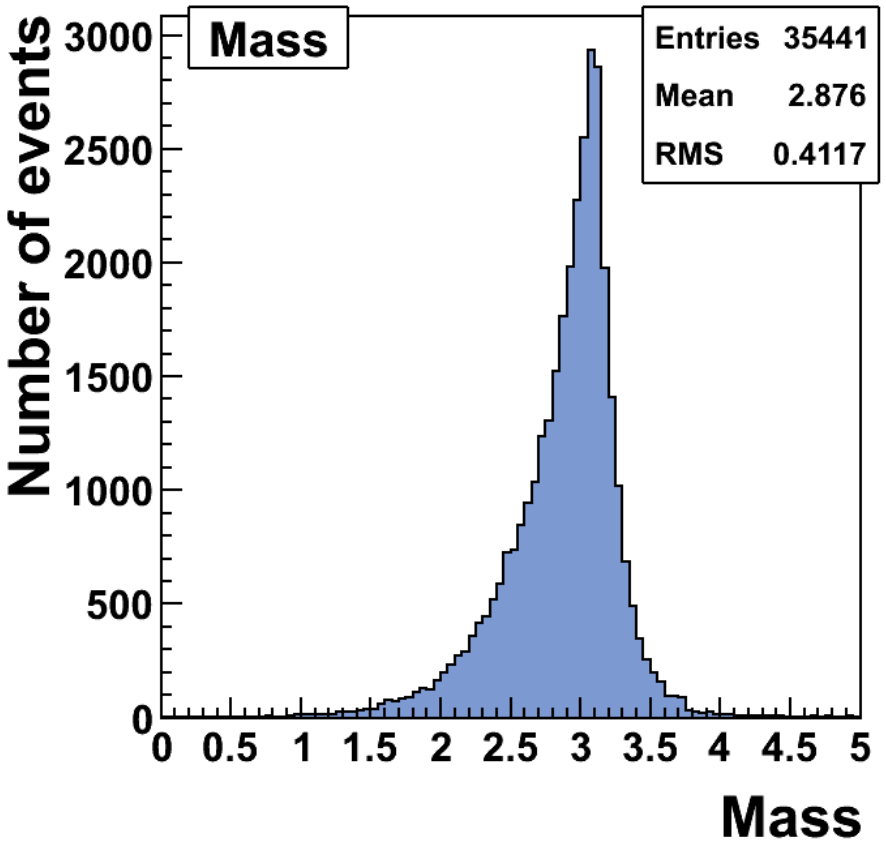
Γ_{e+e-}/Γ = (5.93±0.06)%

Invariant mass of J/ψ

$m_{J/\psi} = 3096.916 \pm 0.011$ MeV

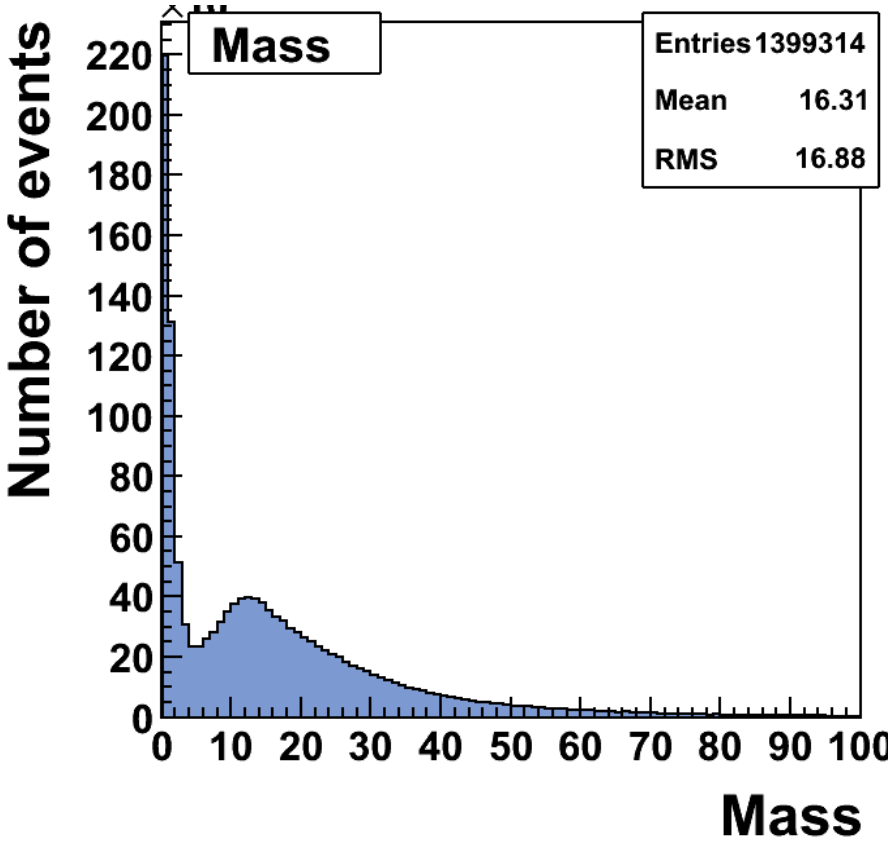


MC True without cuts



MC Reco without cuts

Invariant mass of J/ψ



Data without cuts

Running jobs using CRAB

JPsiEE

Dataset name: /JPsiEE/Spring10-START3X_V26_S09-v1/GEN-SIM-RECO

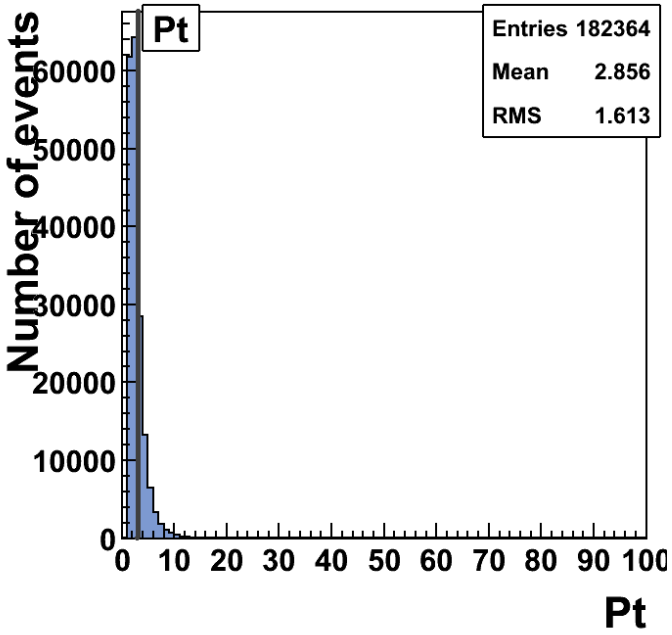
Namber of events: 133,458;

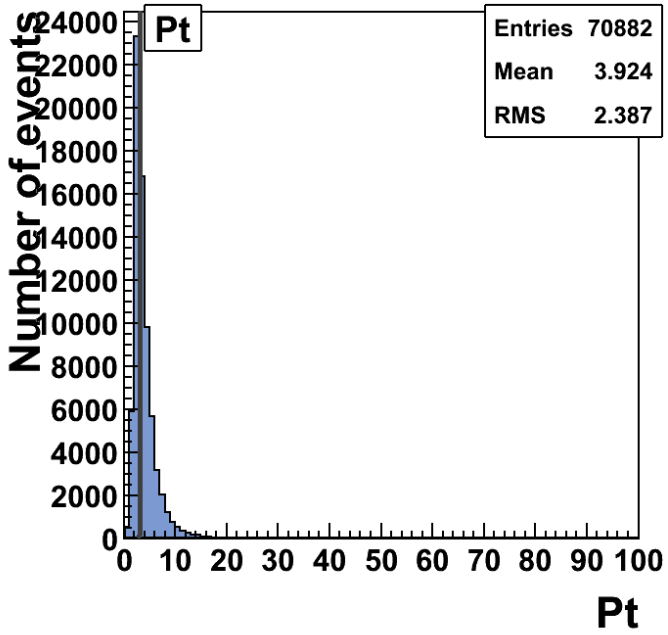
xsec: 13,420,000 pb-1;

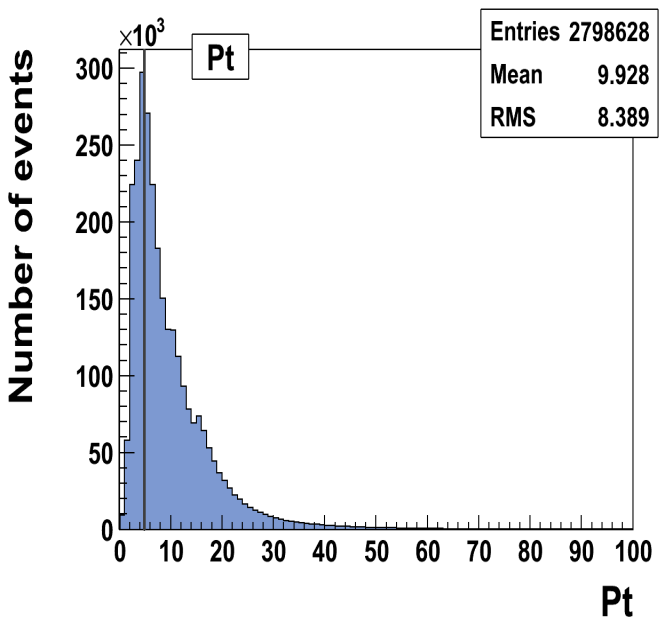
NAF location:

/scratch/hh/current/cms/user/erofem/ntuples/JPsiEE/Spring10-START3X_V26_S09-v1/GEN-SIM-RECO/V00-13-06

p_t distributions for electrons

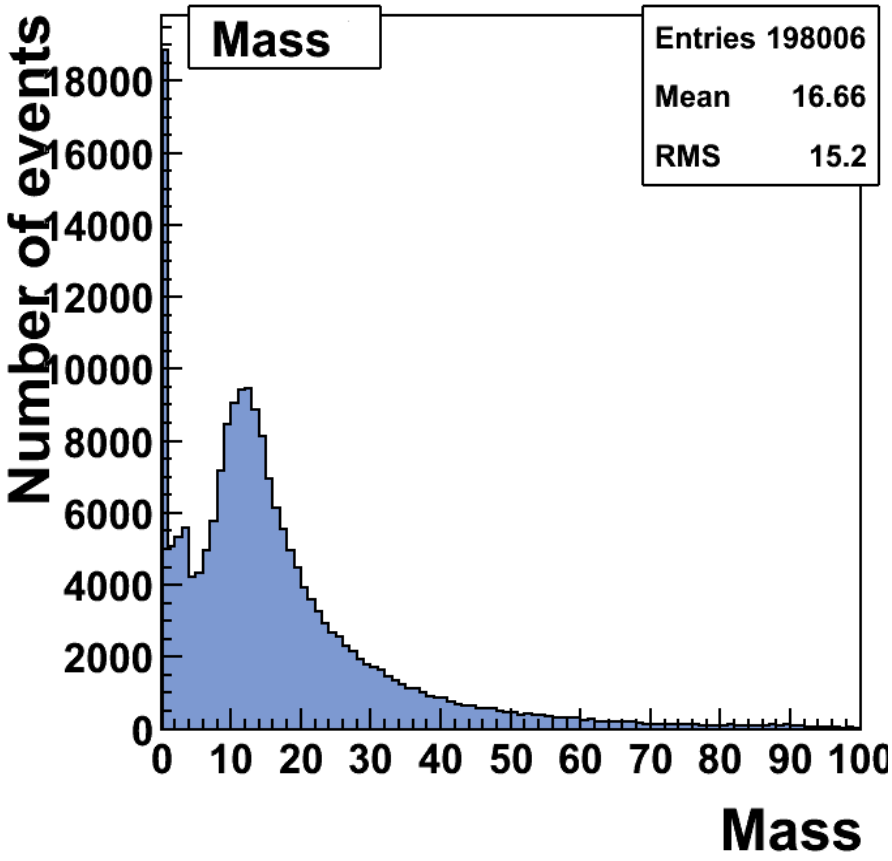






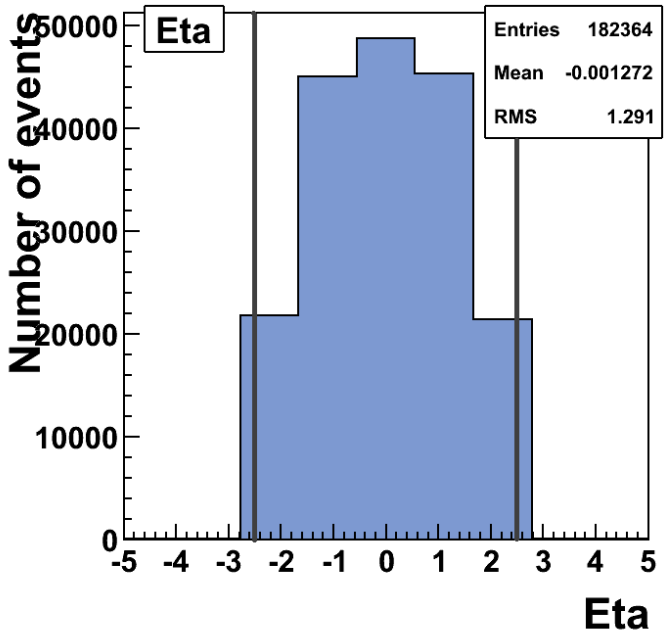
MC True without cuts **MC Reco without cuts** **Data without cuts**

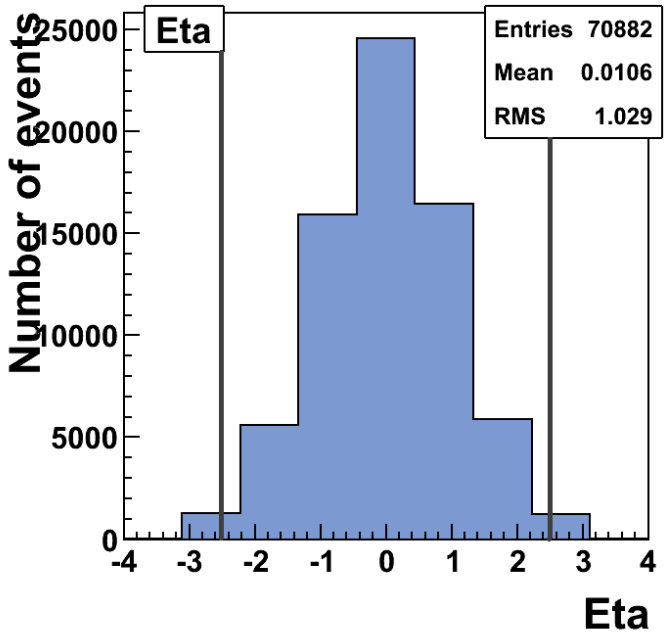
Invariant mass of J/ψ

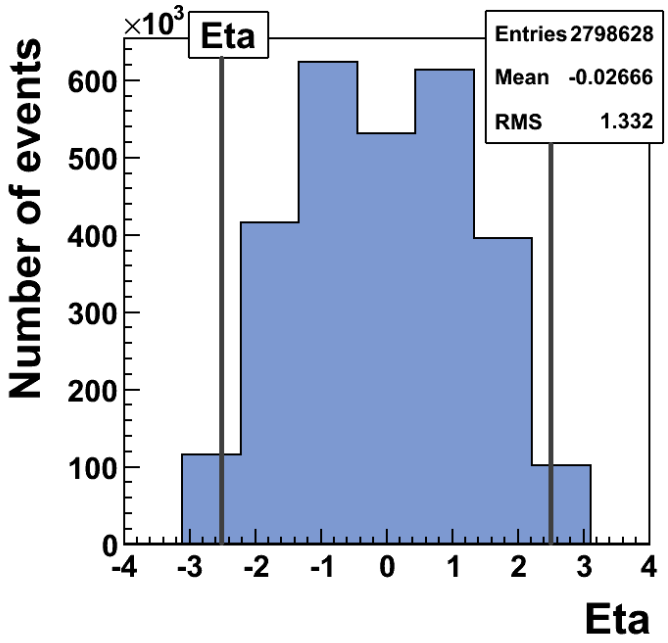


Data with cuts:
$|\eta|<2.5$;
$P_T>3$ GeV;
electronEIDRobustLoosePat.

η distributions for electrons

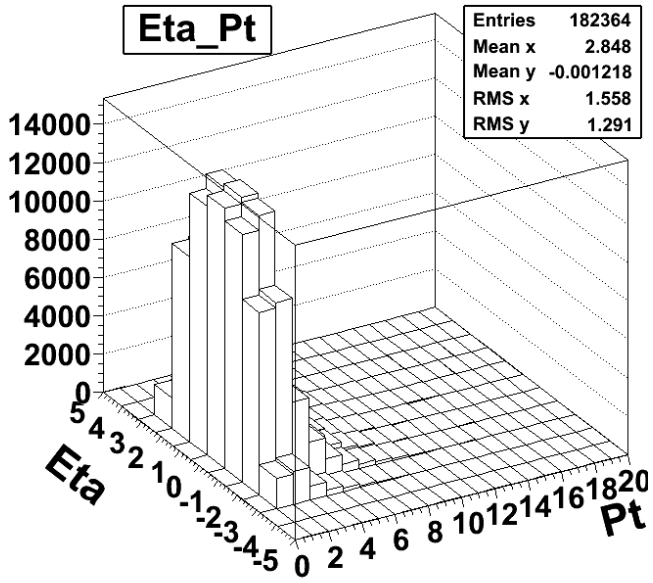


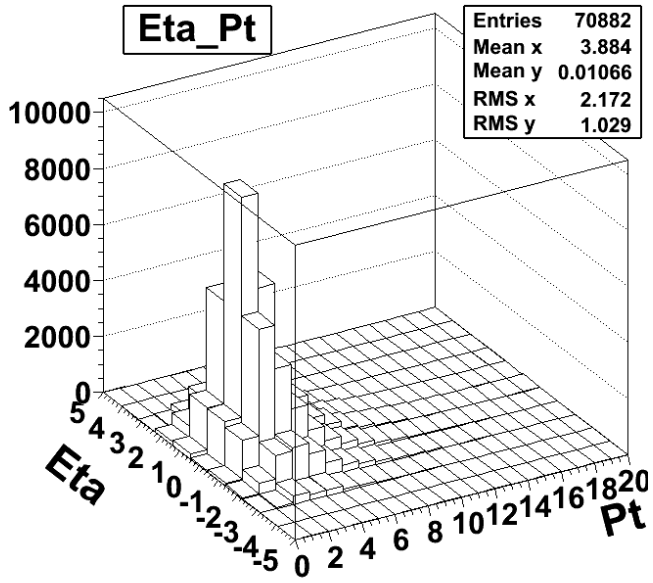


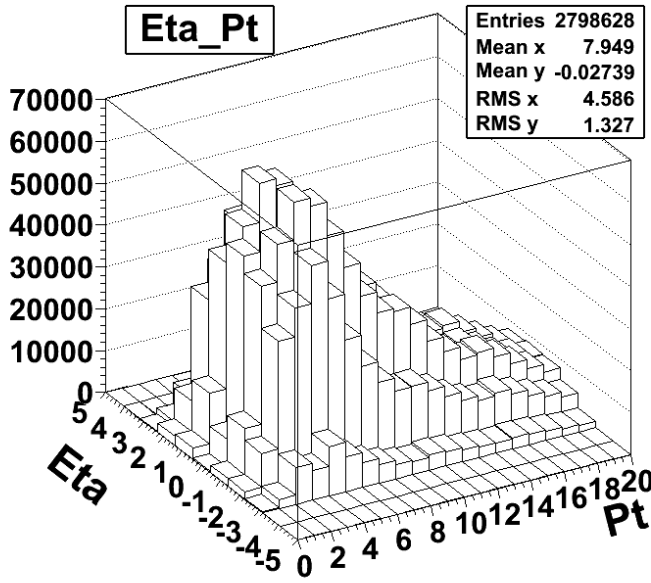


MC True without cuts **MC Reco without cuts** **Data without cuts**

η vs p_T for electrons

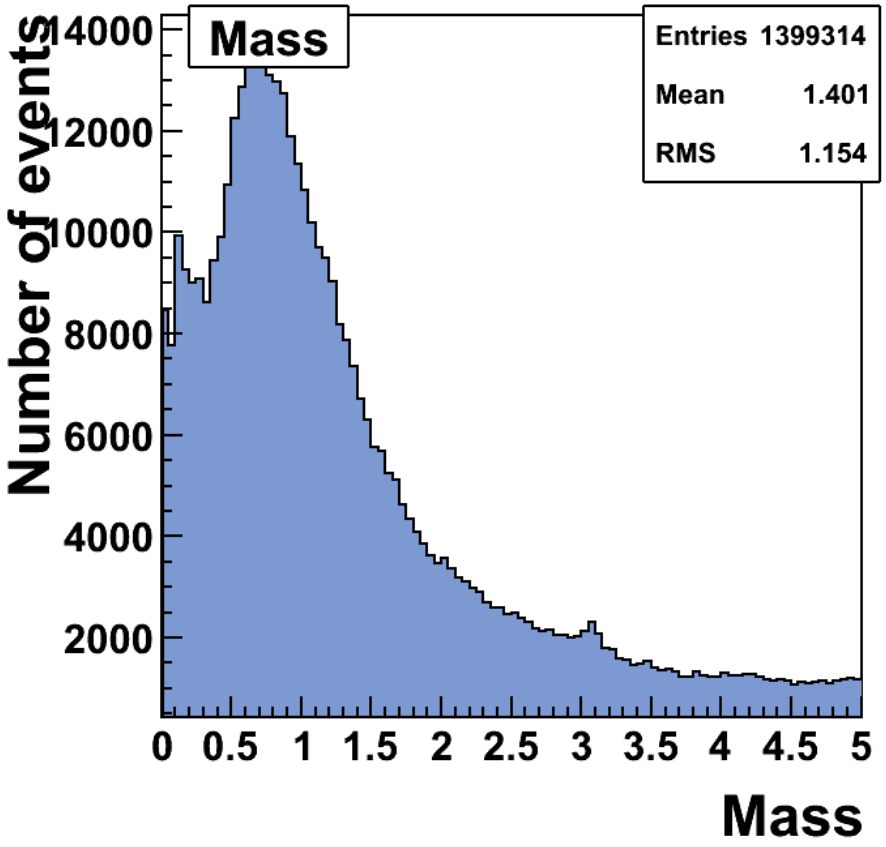




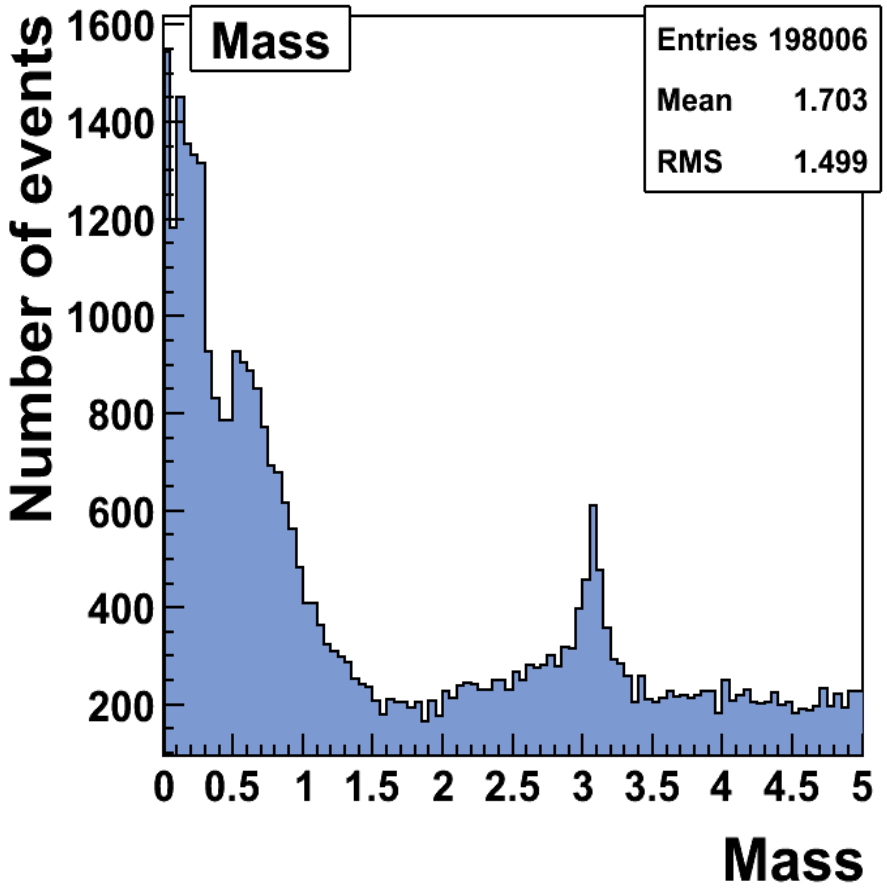


MC True without cuts **MC Reco without cuts** **Data without cuts**

Invariant mass of J/ψ



Data without cuts



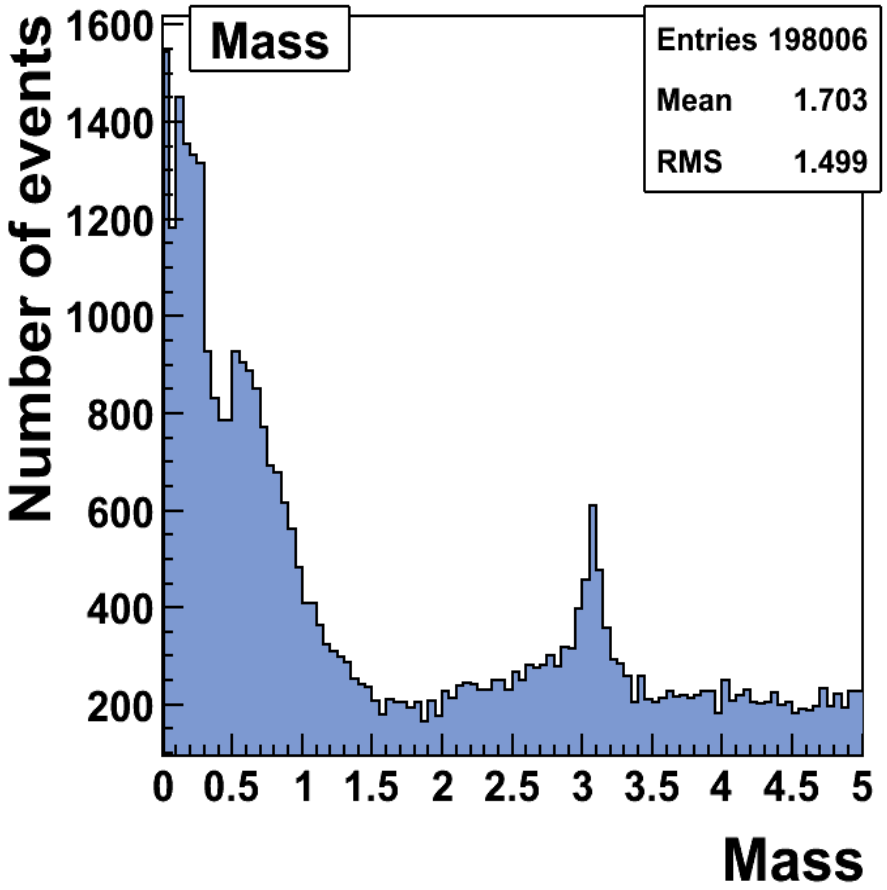
Data with cuts

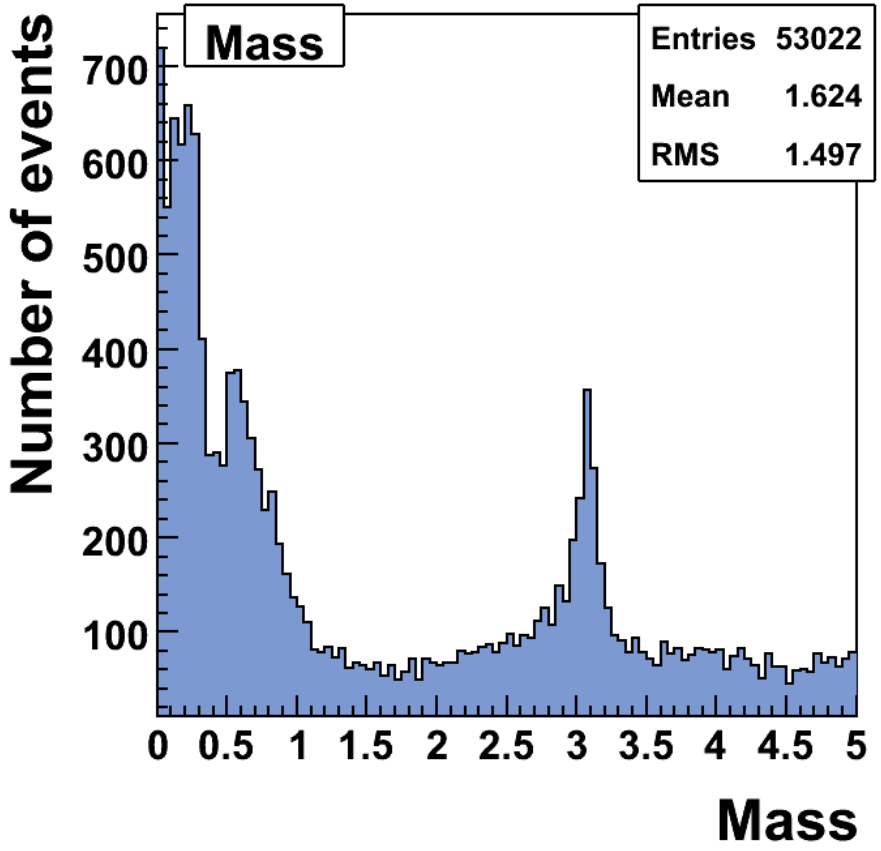
Electron ID in CMS

The special algorithm gives two yes/no outputs for each electron candidate for 9 defined severity levels:

*** VeryLoose**
*** Loose**
*** Medium**
*** Tight**
*** SuperTight**
*** HyperTight1; HyperTight2; HyperTight3; HyperTight4**

Invariant mass of J/ψ





Data with cuts:
electronEIDRobustLoosePat.

Data with cuts:
elelectronEIDRobustTightPat

Summary/Outlook

- **The electron selection can be improved, but the J/ψ-signal can be seen with the selection shown before.**

- **Exist difference in selection by different electron ID: for the Tight electrons the J/ψ-signal is more evident than for the Loose.**

- **Next step will be to calculate the J/ψ cross section.**