

CMS Analysis Status:

Inclusive $b \rightarrow J/\psi X$, $J/\psi \rightarrow \mu \mu$

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Outline

- Data Samples
- Gen, Reco, Eff & Fitting
- Outlook

CMS Summer08 M.C. data samples

b2J/psi

1,413,547

p-J/psi

1,941,162

QCD

5,132,579

- ❑ **/BtoJpsiMuMu/Summer08_IDEAL_V9_PAT_v1/USER** CMSSW_2_2_1
 Created 22 Jan 2009, 4817138 events, 137 files, 1 block(s), 139.7GB, located at 1 site
- ❑ **/BtoJpsiMuMu/Summer08_IDEAL_V11_redigi_v1/GEN-SIM-RECO**
 Created 09 Jan 2009, 2453008 events, 1536 files, 16 block(s), 635.7GB, located at 4 sites

Sum08 Incl b: ~100 pb-1
- ❑ **/JPsi/Summer08_IDEAL_V11_redigi_v1/GEN-SIM-RECO** CMSSW_2_2_1
 Created 18 Feb 2009, 1941162 events, 382 files, 2 block(s), 394.1GB, located at 4 site

Sum08 pJpsi: ~16 pb-1
- ❑ **InclusivePPmuX/Summer08_IDEAL_V9_PAT_v1/USER** CMSSW_2_2_1
 Created 22 Jan 2009, 10345428 events, 312 files, 1 block(s), 304.5GB, located at 3 sites
- ❑ **/InclusivePPmuX/Summer08_IDEAL_V11_redigi_v1/GEN-SIM-RECO**
 Created 18 Dec 2008, 5309035 events, 1702 files, 18 block(s), 1.5TB, 11 sites

Sum08 QCD: ~0.044 pb-1

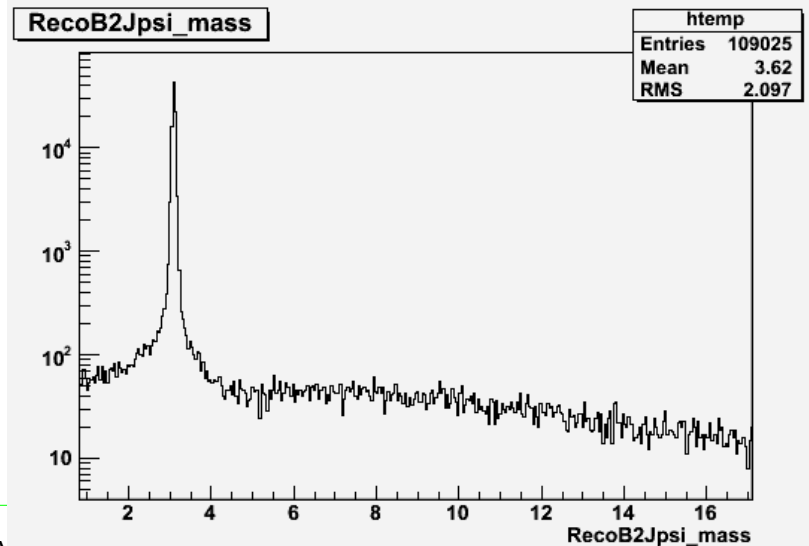
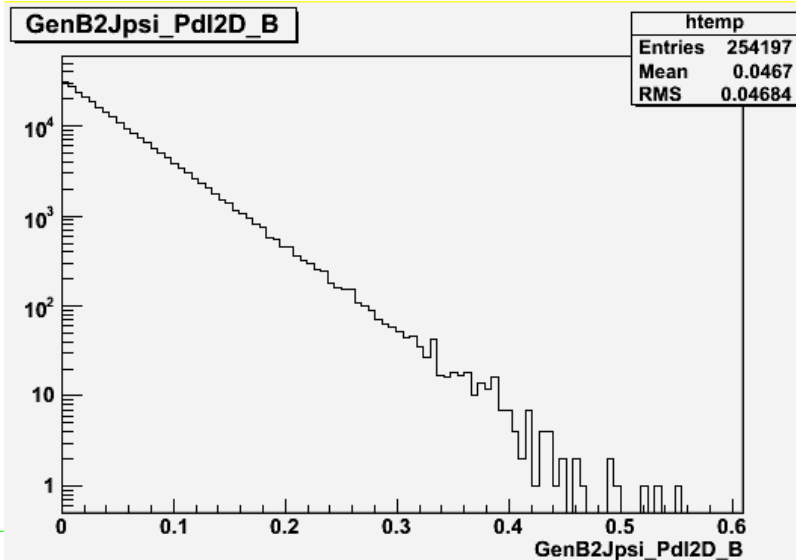
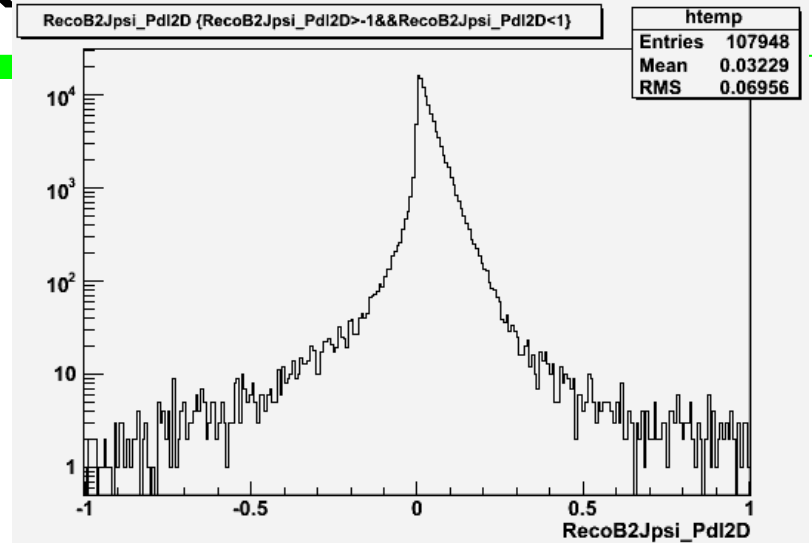
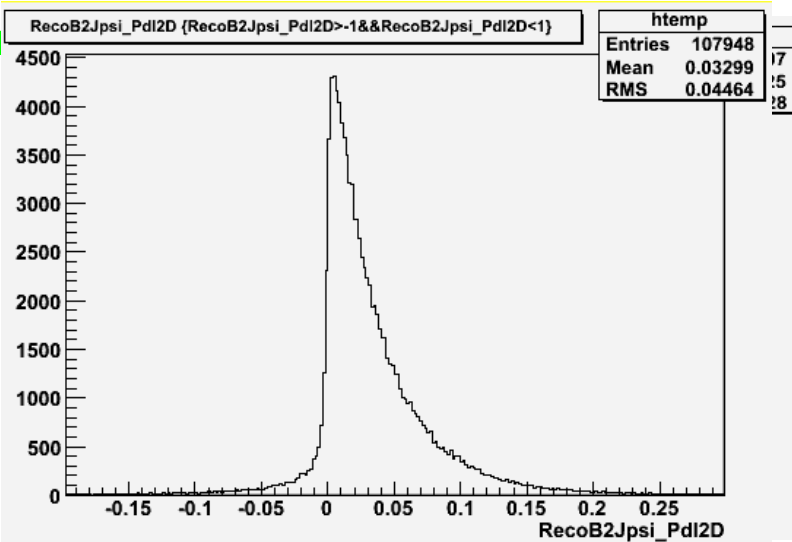
Early Data with 10 pb-1 analysis

events normalized or scaled to:

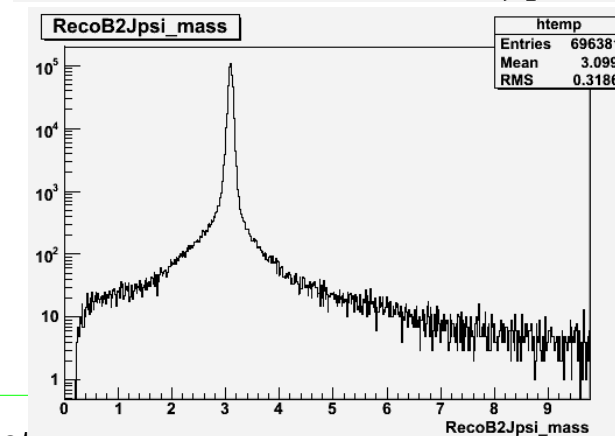
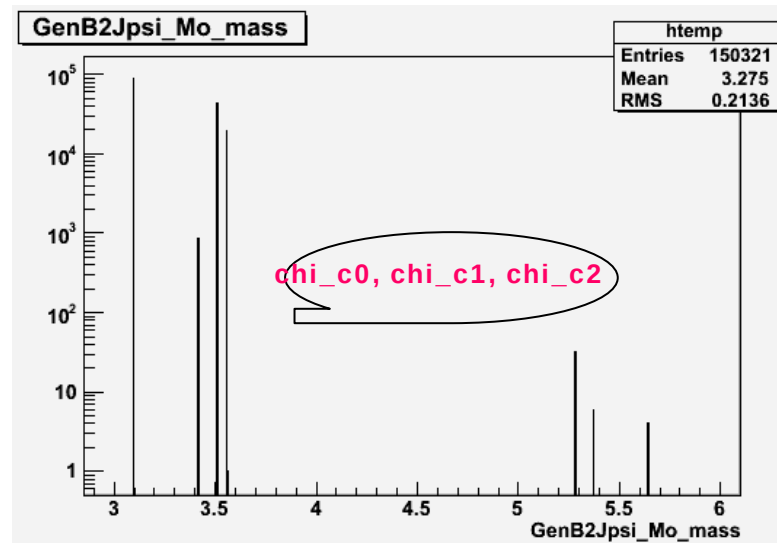
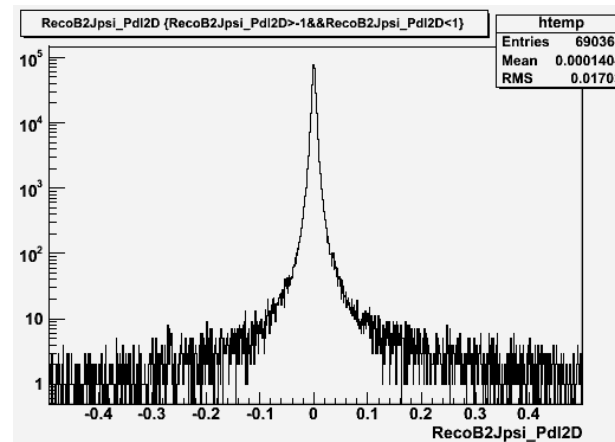
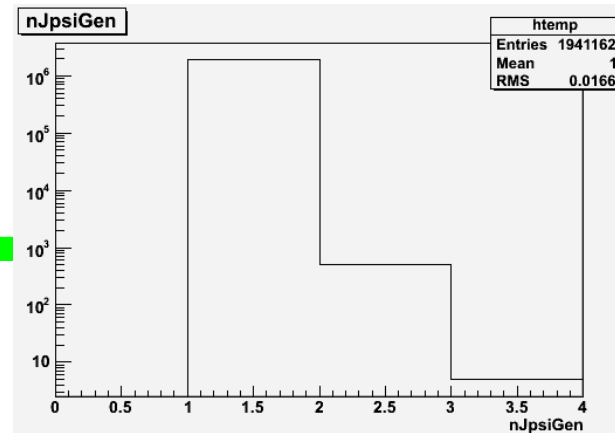
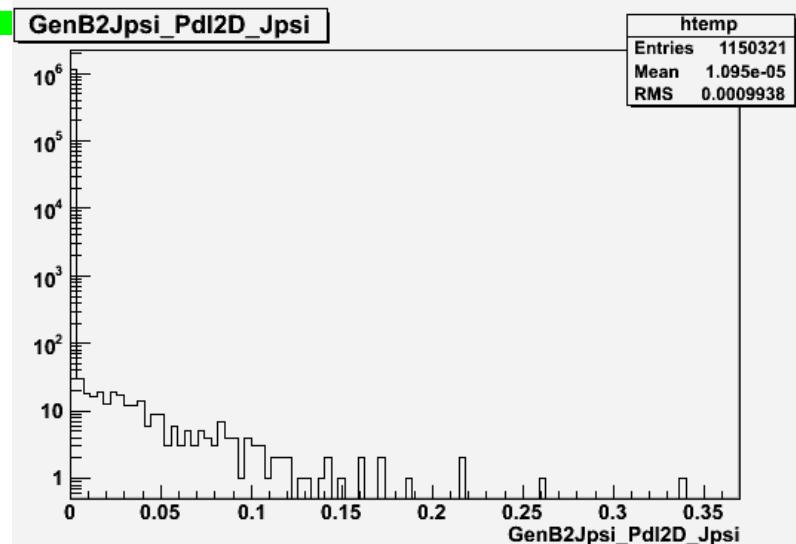
- ❑ Inclusive b: 253,600(SW227)
- ❑ P-J/Psi: 1,150,000(SW227)
- ❑ Inclusive PPmuX: 5,132,579(SW227)

Scale: 231.5->1,188,000,000

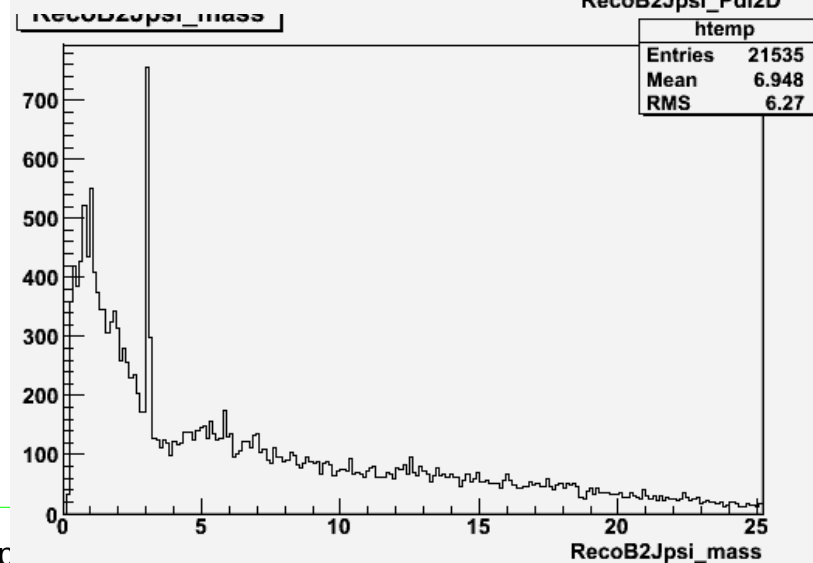
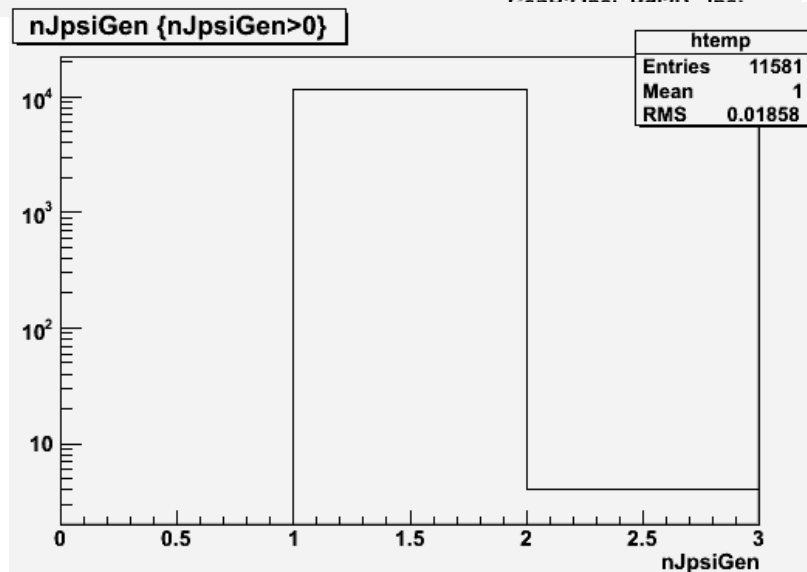
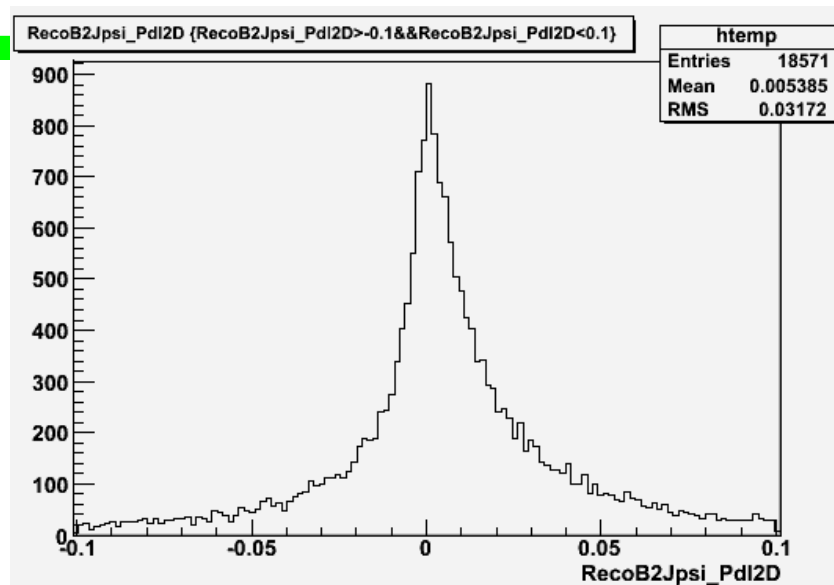
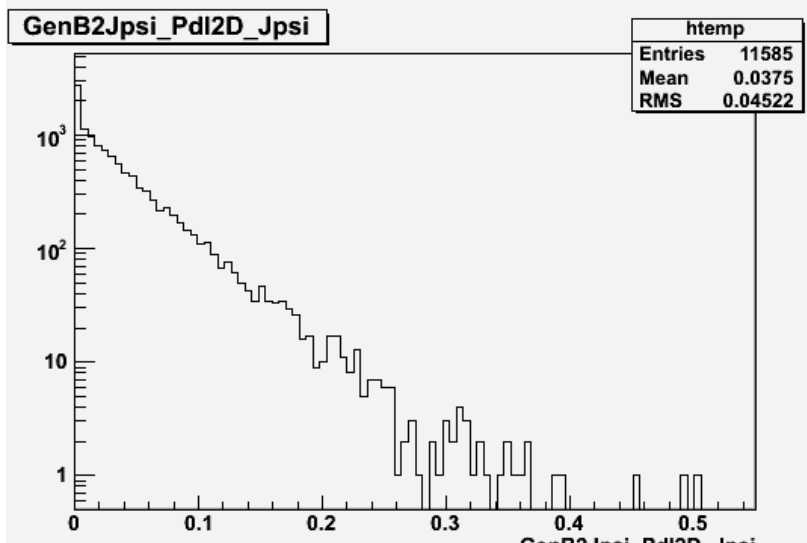
Inclusive b: Gen & Reco



Prompt J/Psi



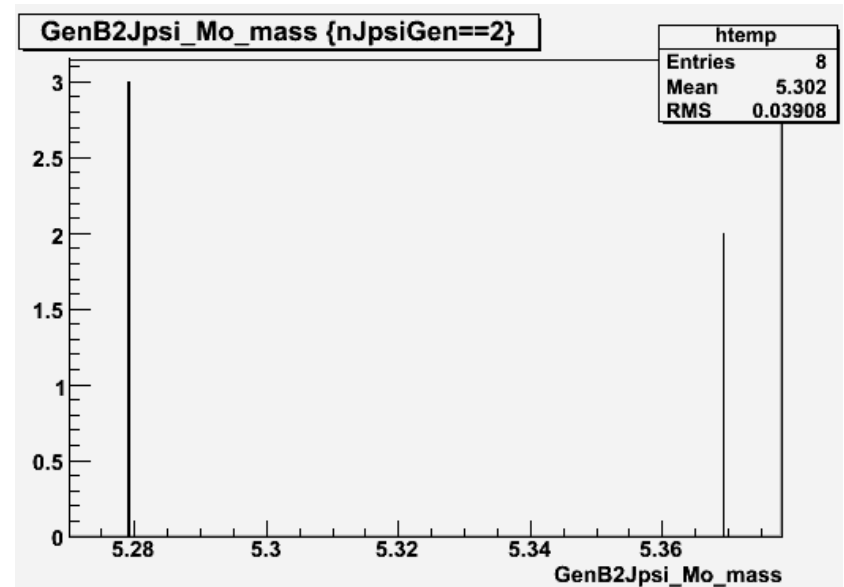
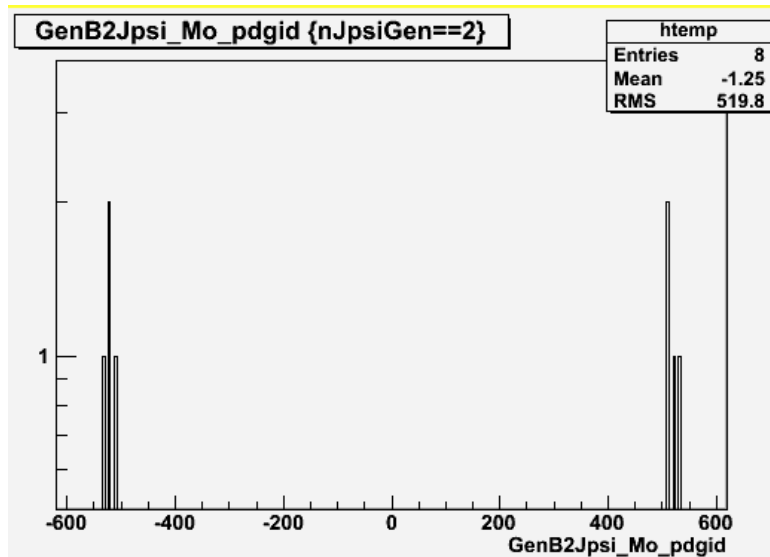
PPmuX



2009-04-24

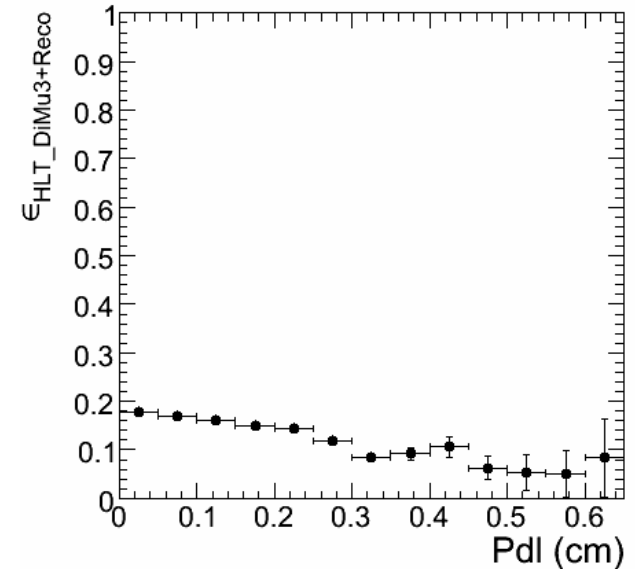
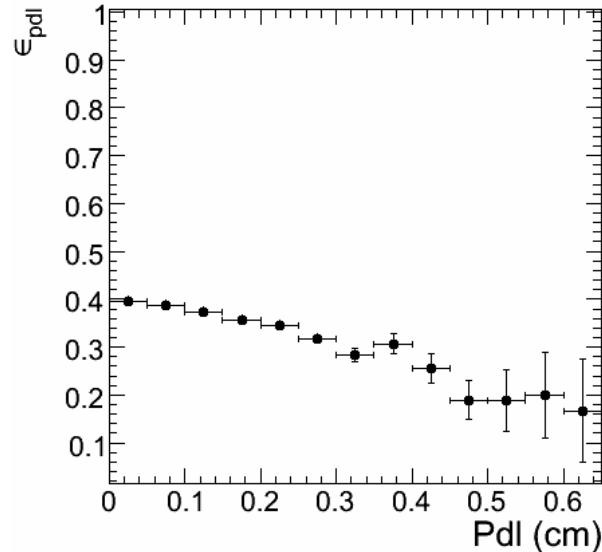
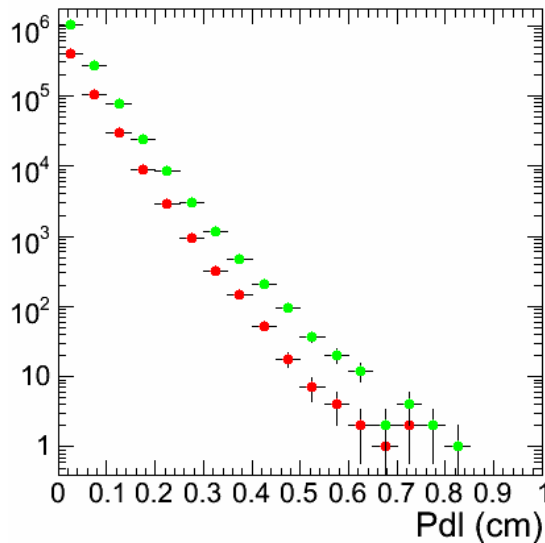
CMS B-physics Group

PPmuX: 2 JPsi's mother_id & mass



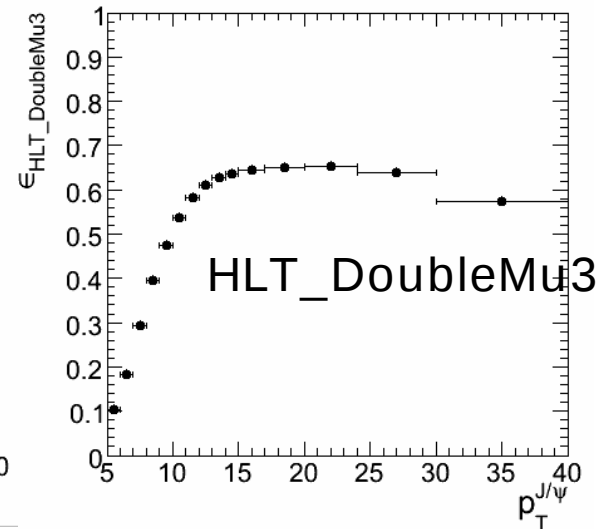
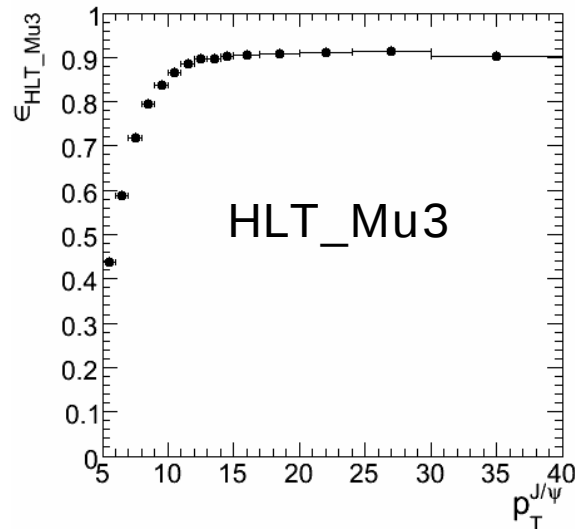
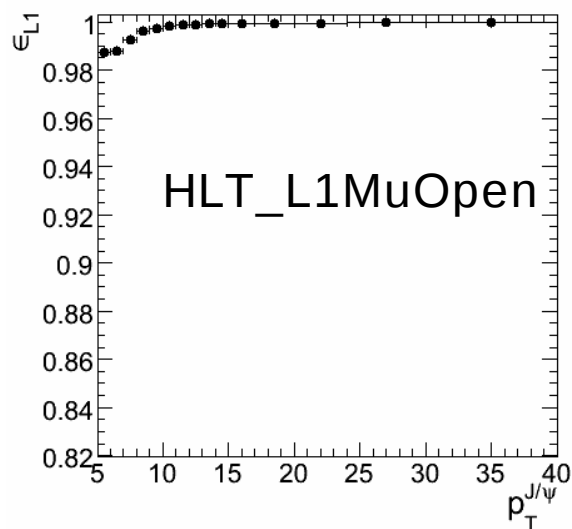
511 B0
521 B+
531 B_s0

Efficiency: Pdl



$$\epsilon_{Pdl} = \frac{N_{Gen}^{Matching_L1+HLT+Offline}(Pdl^{J/\psi}, p_T^{J/\psi}, |\eta^{J/\psi}| < 2.4)}{N_{Gen}(Pdl^{J/\psi}, p_T^{J/\psi}, |\eta^{J/\psi}| < 2.4)}$$

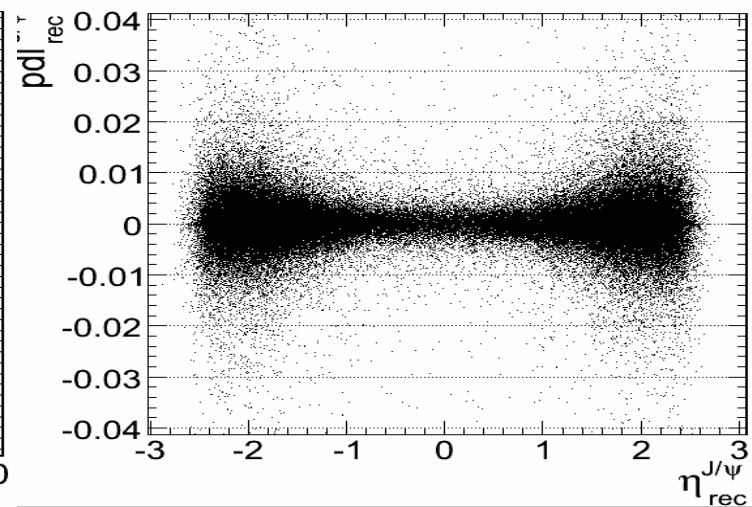
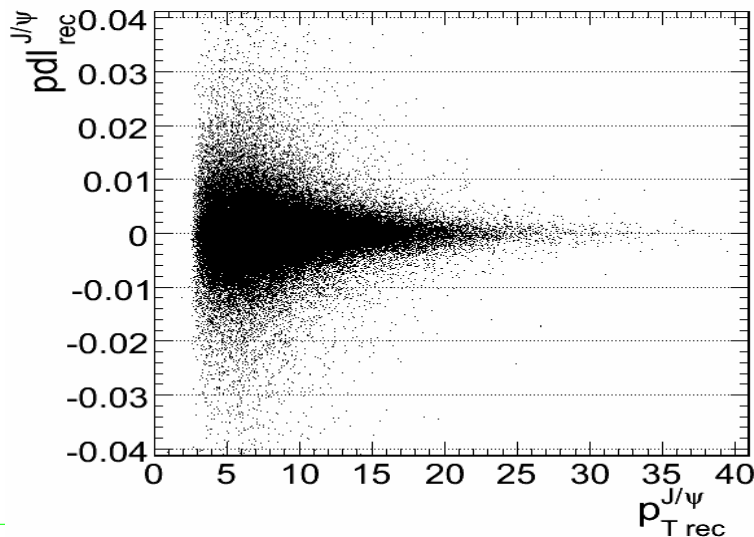
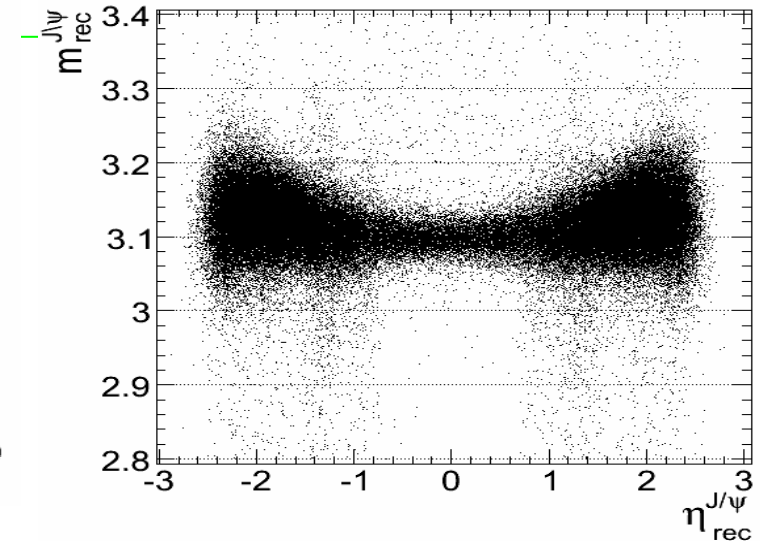
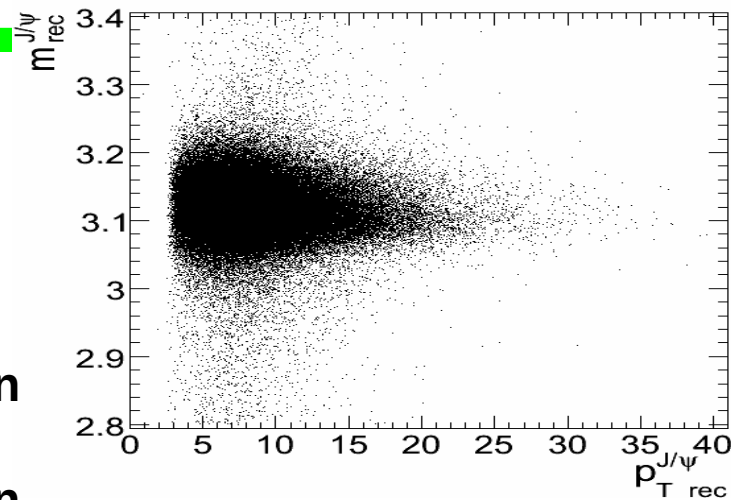
Trig Efficiency: JPsi's



$$\epsilon_{L1,L1+HLT}^{w.r.t.Offline} = \frac{N_{L1,L1+HLT}^{Offline+Glb}(p_T^{J/\psi}, |\eta^{J/\psi}| < 2.4)}{N^{Offline+Glb}(p_T^{J/\psi}, |\eta^{J/\psi}| < 2.4)}$$

Mass & p_T fitting: resol. model

Mass:
3Gaussian
P_d:
2Gaussian



pT: 9-10GeV

Offline p-jpsi: 11545

b: 4288

a finite experimental resolution
on each measurement

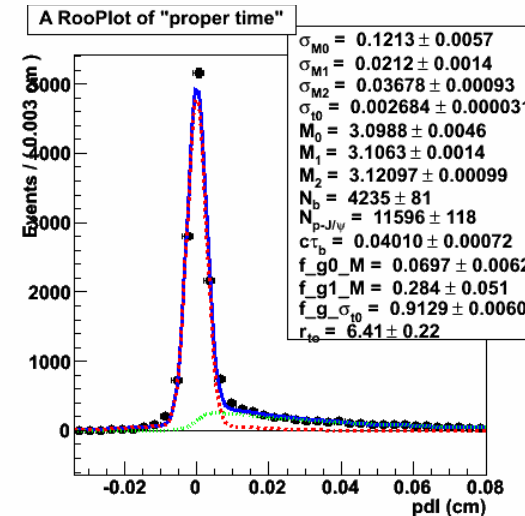
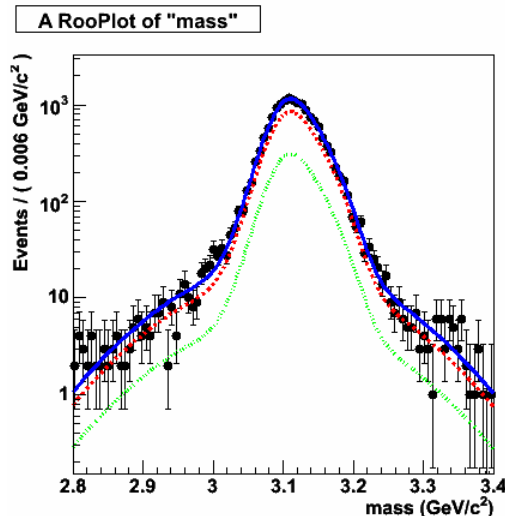
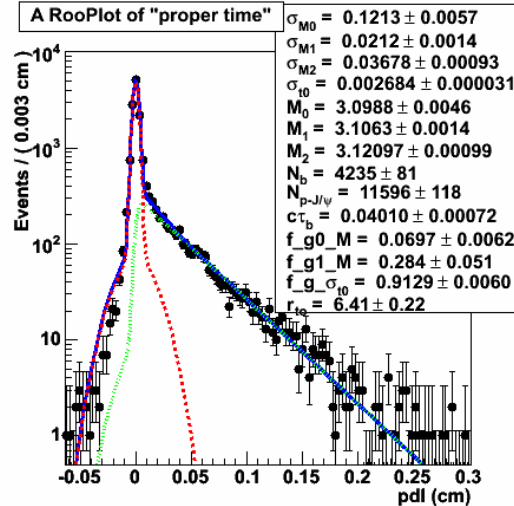
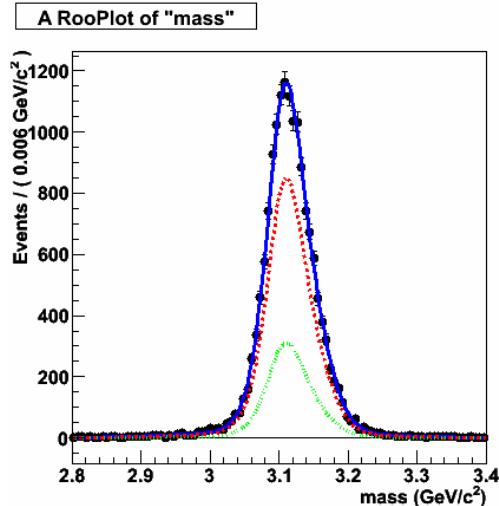
$$F_I(t) = \exp(-t/\tau)$$

$$F_R(t) = \exp(-t/\tau) \otimes G(t, \mu, \sigma) \\ \equiv \int dt' \exp(-t'/\tau) G(t-t', \mu, \sigma)$$

$$F_E(t, dt) \\ = \exp(-t/\tau) \otimes G(t, \mu, dt)$$

$$F_E(t, dt) \\ = \varepsilon(t) \cdot \exp(-t/\tau) \otimes G(t, \mu, s \cdot dt)$$

(t, dt) fitting with new
version RooFit package
in Root 5.22



To do List

□ anal on Sum08 data @10TeV

- Efficiency: Accept., Trig & reco. :M.C. & T.P.

- Comprehensive anal method

 - Pdl efficiency

 - Scale factor

 - RooFit on new Model <- 1 or 1.5 weeks

- Unfolding & final spectrum <- in 2 weeks

□ Prepare PAS and Note draft.



backups

Pseudo proper decay length

$$\begin{aligned}\vec{X} &= \vec{x}_B - \vec{x}_{prim} & L_{xy}^B &= \frac{\vec{X} \cdot \vec{p}_T^B}{|\vec{p}_T^B|} \\ \lambda^B &= \frac{L_{xy}^B}{(\beta\gamma)_T^B} = L_{xy}^B \cdot \frac{M_B}{p_T^B} & \lambda_\psi &= \frac{L_{xy}^\psi}{(\beta\gamma)_T^\psi} = L_{xy}^\psi \cdot \frac{M_\psi}{p_T^\psi} \\ \lambda &= \frac{\lambda_\psi}{\langle F(p_T^\psi) \rangle} = L_{xy}^\psi \cdot \frac{M_\psi}{p_T^\psi \langle F(p_T^\psi) \rangle} & F(p_T^\psi) &= \frac{(\beta\gamma)_T^B}{(\beta\gamma)_T^\psi} = \frac{\lambda_\psi}{\lambda_B}\end{aligned}$$

- Measure the 2-dimensional decay length L_{xy} for the J/Ψ meson sample
- pseudo proper decay length distribution
- Measure the 1 distribution of the background under the J/Ψ by studying the $\mu^+ \mu^-$ mass sidebands of the J/Ψ
- Fit the distribution to the sum of background, direct (zero-lifetime) and B decay (non-zero lifetime) Contributions and extract the lifetime