

# **Physics Performance : Status Report from Leptonic b&c AWG**

*Mousumi Datta*

*University of Wisconsin, Madison*

*BaBar Monte Carlo Simulation Workshop*

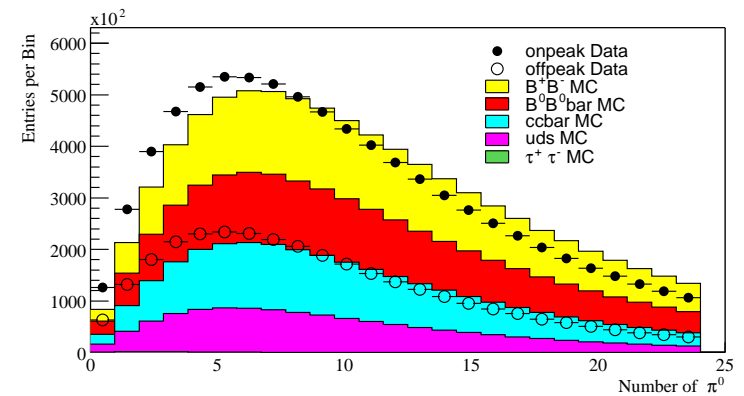
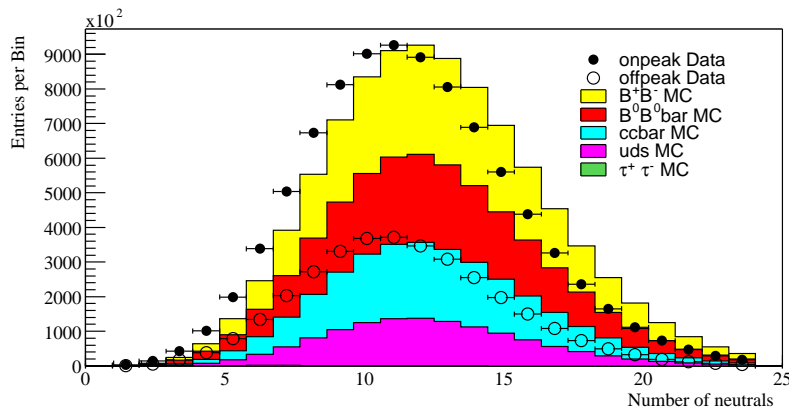
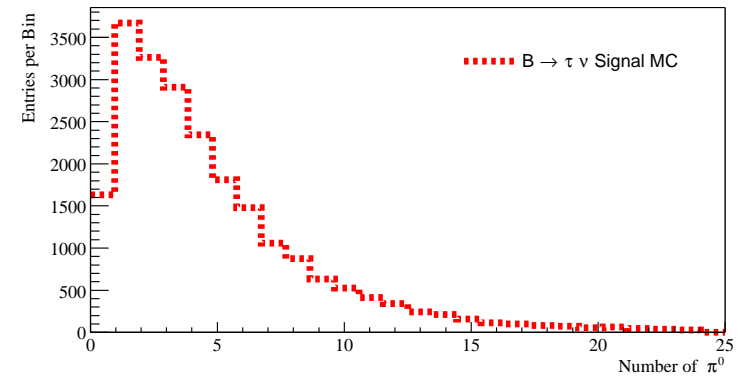
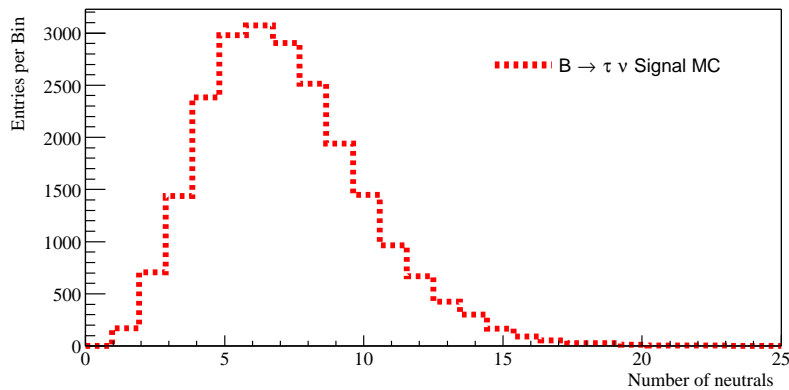
*July 12, 2004*

*SLAC*

# Recoil Method Analysis

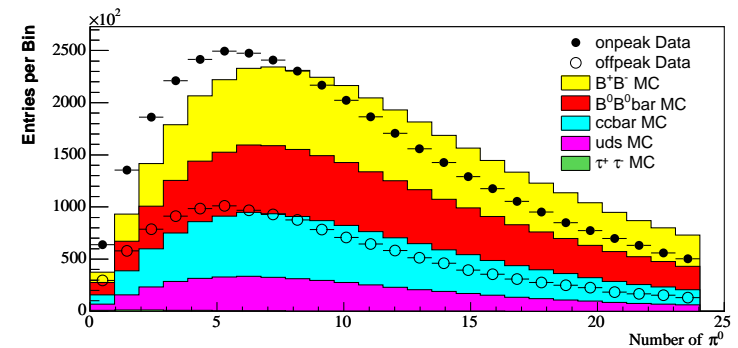
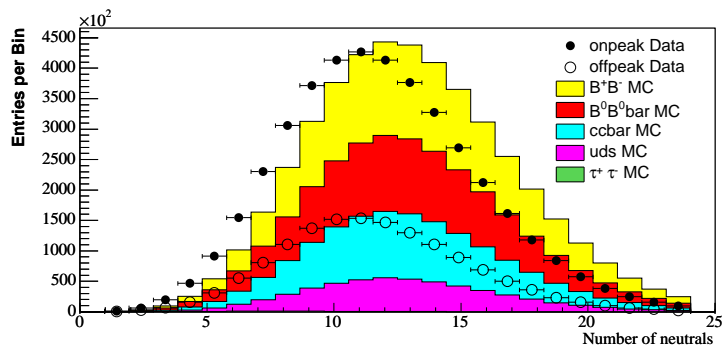
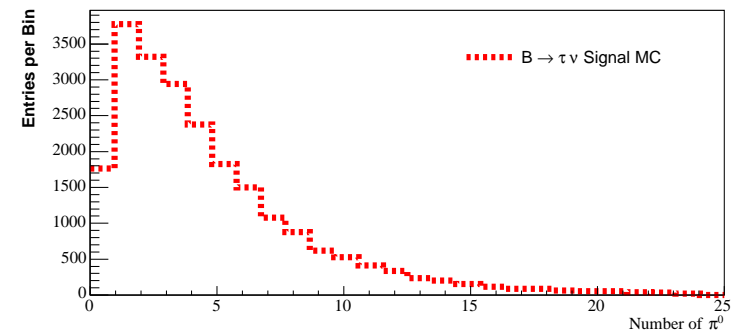
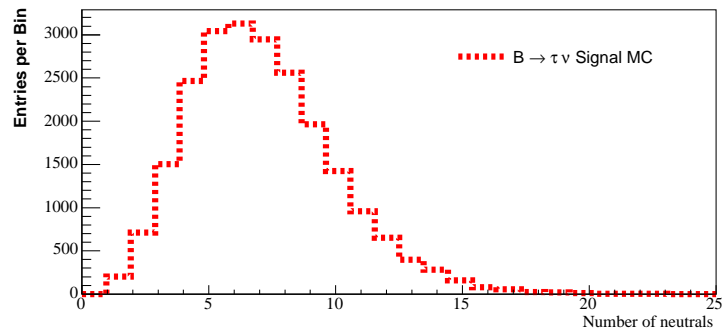
- Decays with very little experimental constraints
  - $B \rightarrow K\nu\nu$ ,  $B \rightarrow \tau\nu$ ,  $B \rightarrow$  invisible
- One of the B meson reconstructed in hadronic and semi-leptonic decay modes
  - $B \rightarrow D^{(*)}X_{\text{had}}$
  - $B \rightarrow D\nu X$  ( $X=\pi^{\pm}, \pi^0, \gamma$  or nothing), exclusive  $D^*\nu$
- On the recoil of the reco-B look for signal decay:
  - Number of tracks consistent with the decays of interest (zero, one or three)
  - The remaining neutral energy in the calorimeter, excluding any neutral from the reco-B ( $E_{\text{extra}}$ ), has to be low (  $\sim 300$  MeV to below)
- **Sensitive to simulation of neutrals including beam-background, hadronic split-offs etc.**

# Photon and $\pi^0$ Multiplicity 12-series

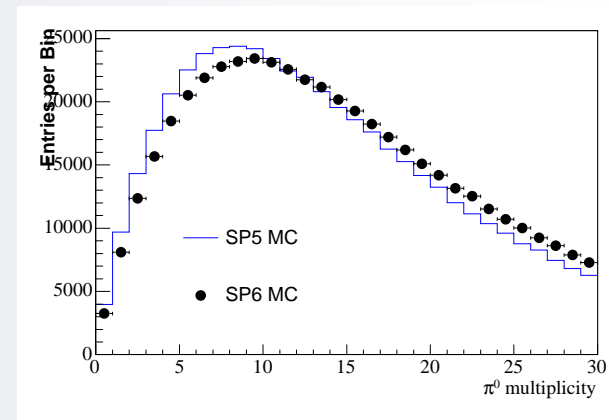
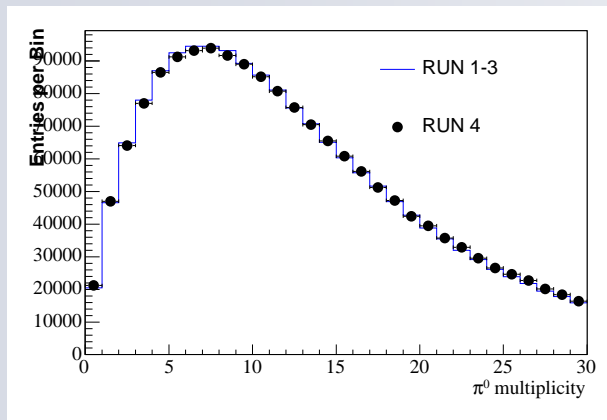
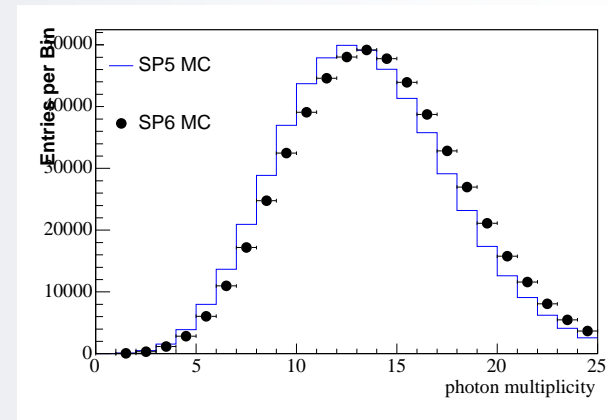
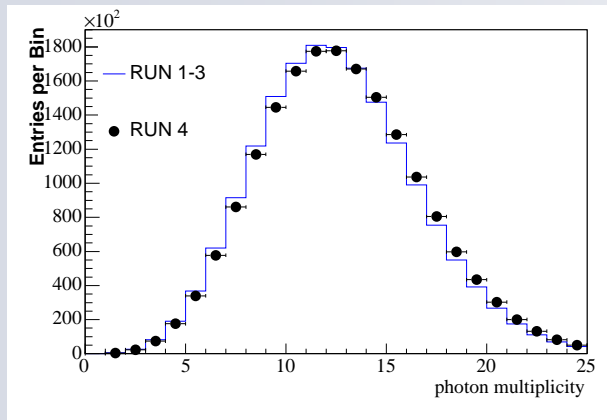


# Photon and $\pi^0$ Multiplicity

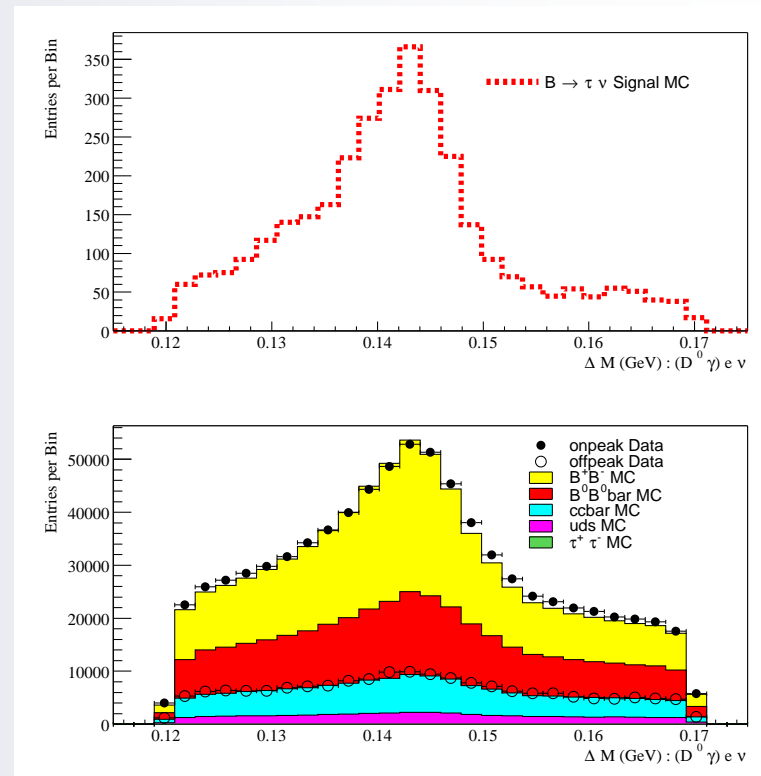
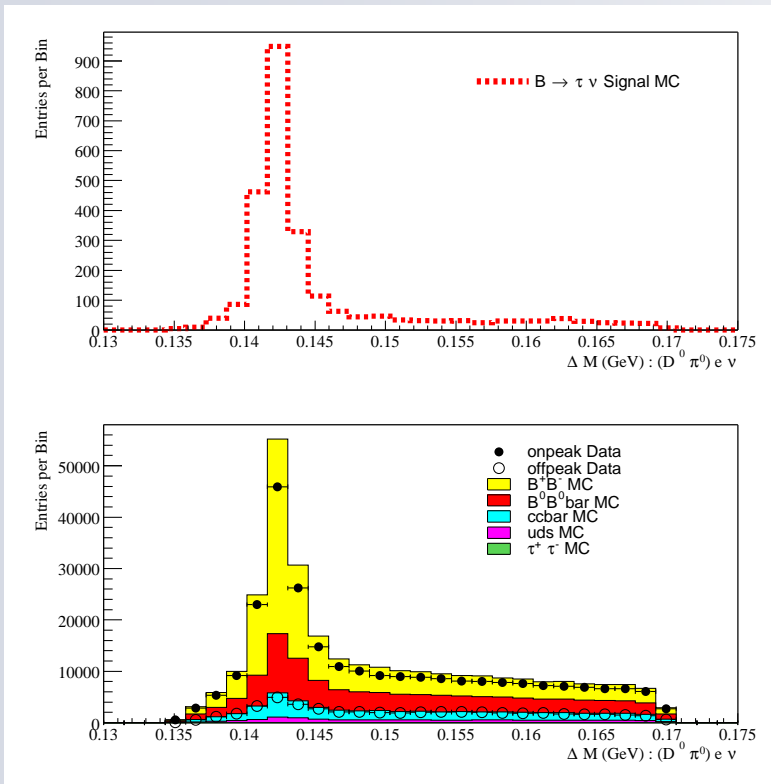
## 14-series



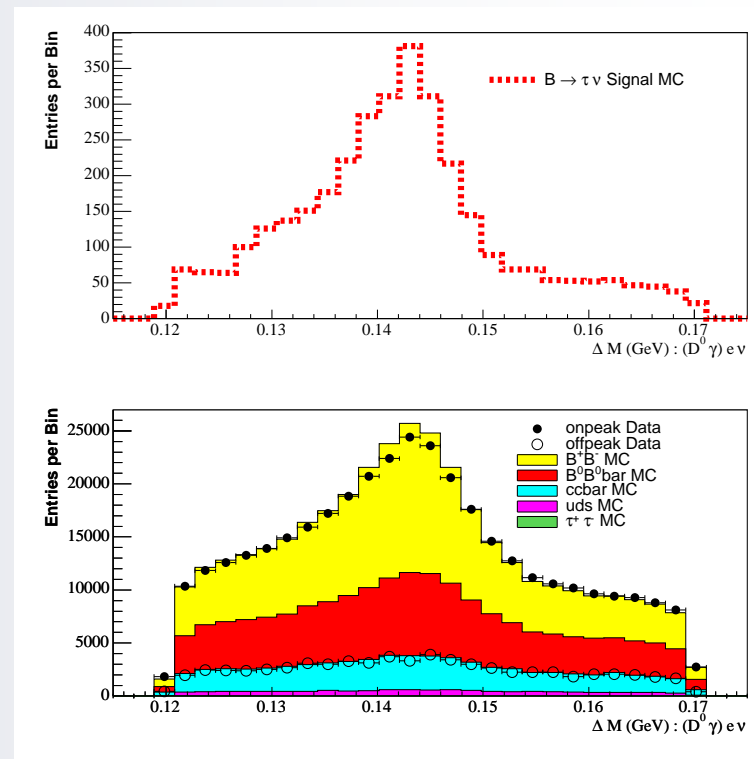
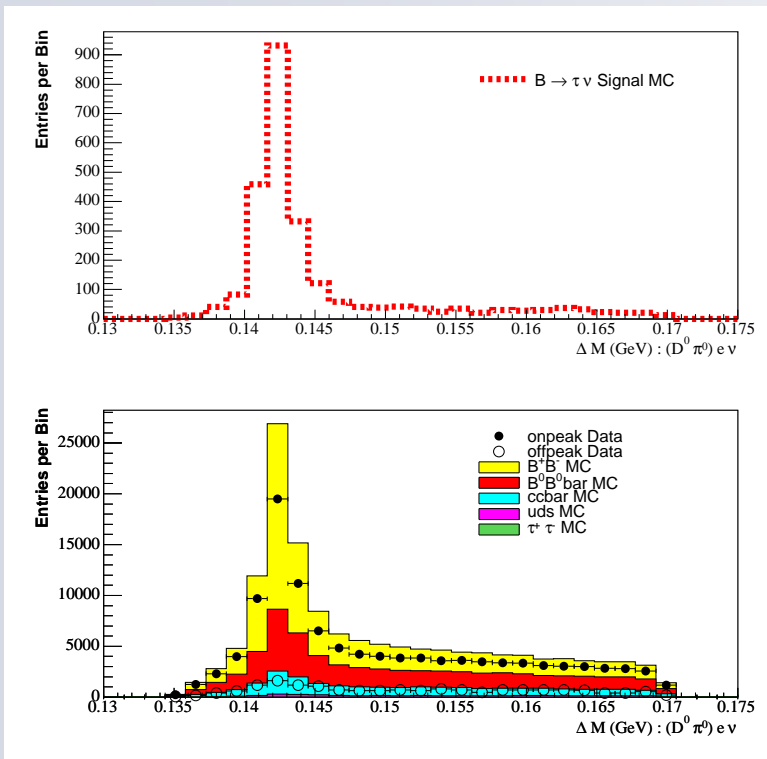
# 12-series VS 14-series



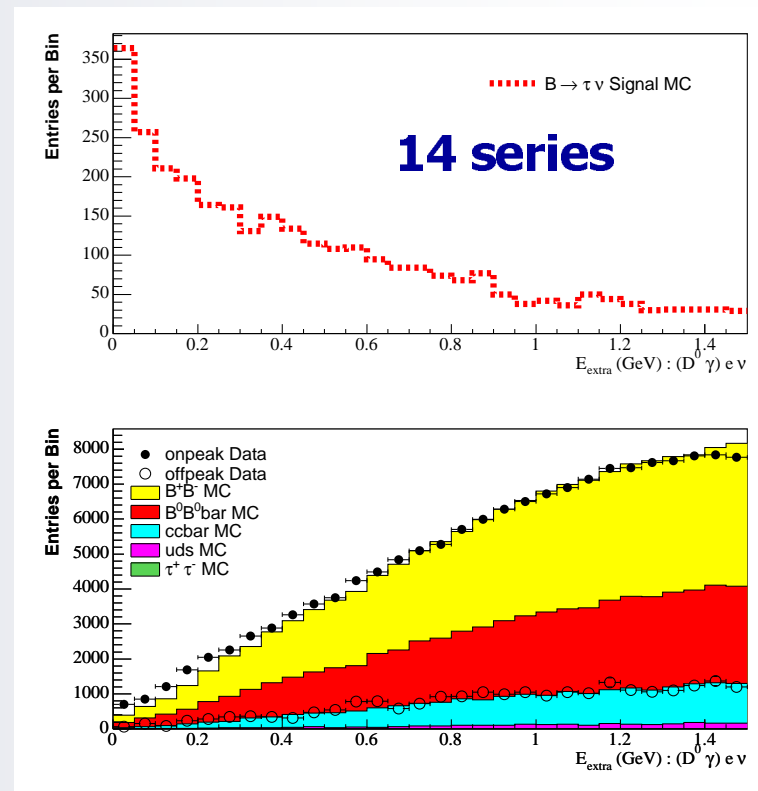
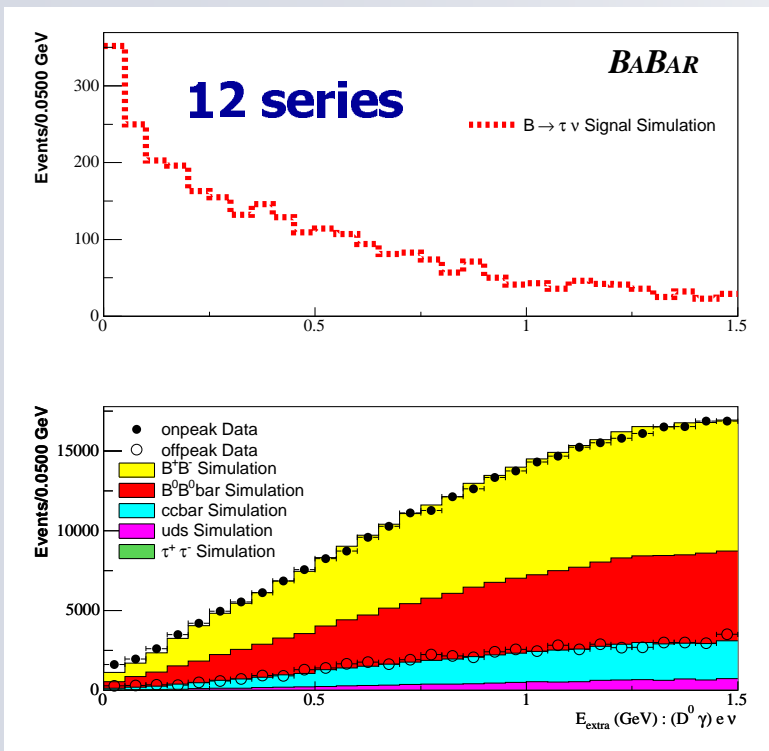
# Soft Neutral from $D^{*0}$ (12 series)



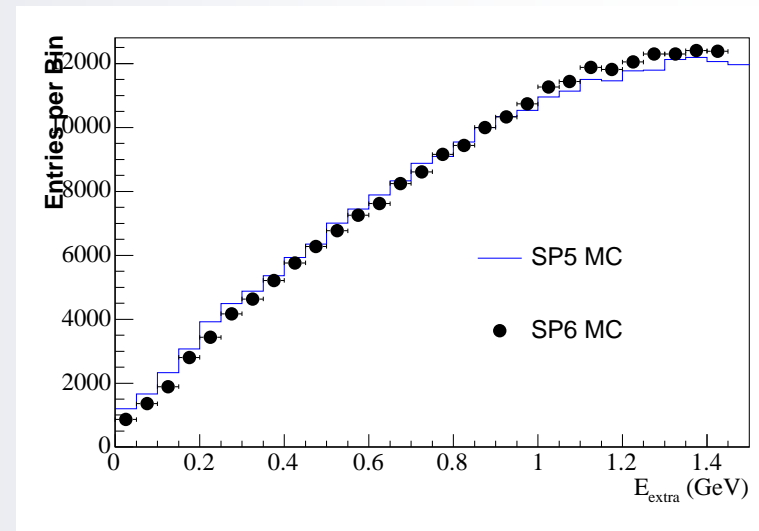
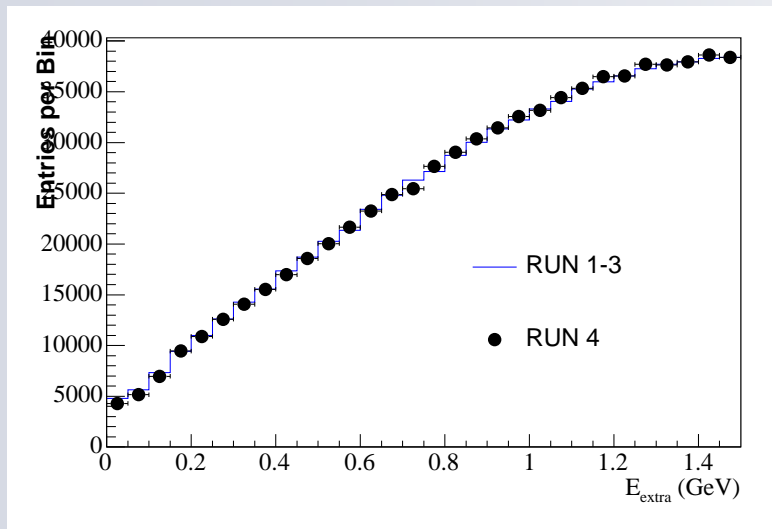
# Soft Neutral from $D^{*0}$ (14 series)



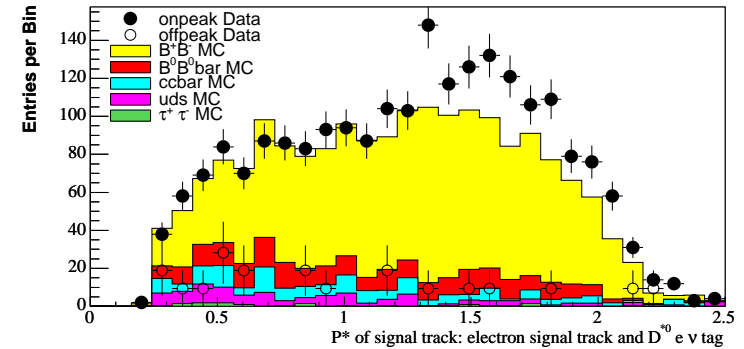
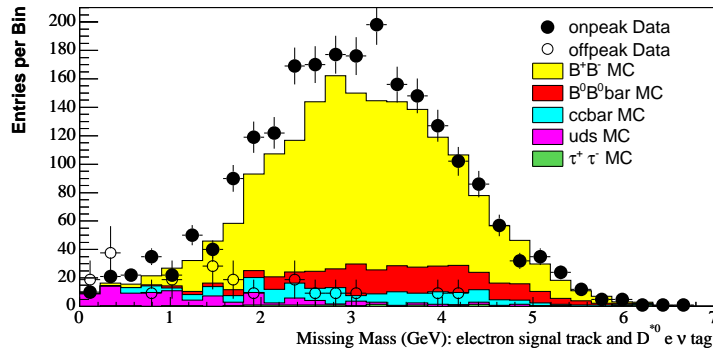
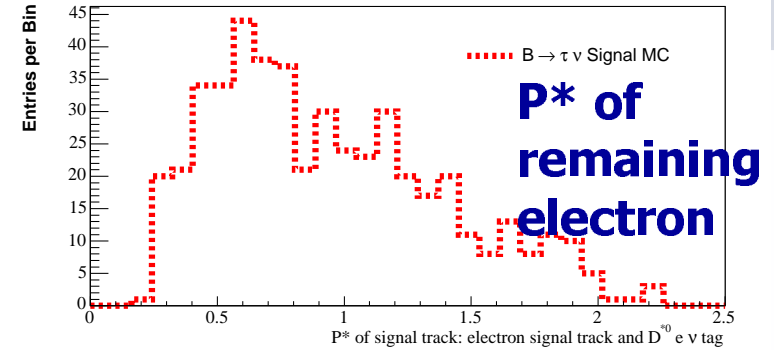
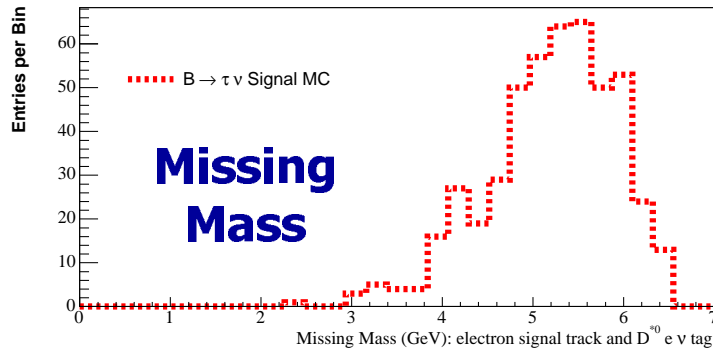
# Remaining Neutral Energy in the Calorimeter



# 12-series VS 14-series

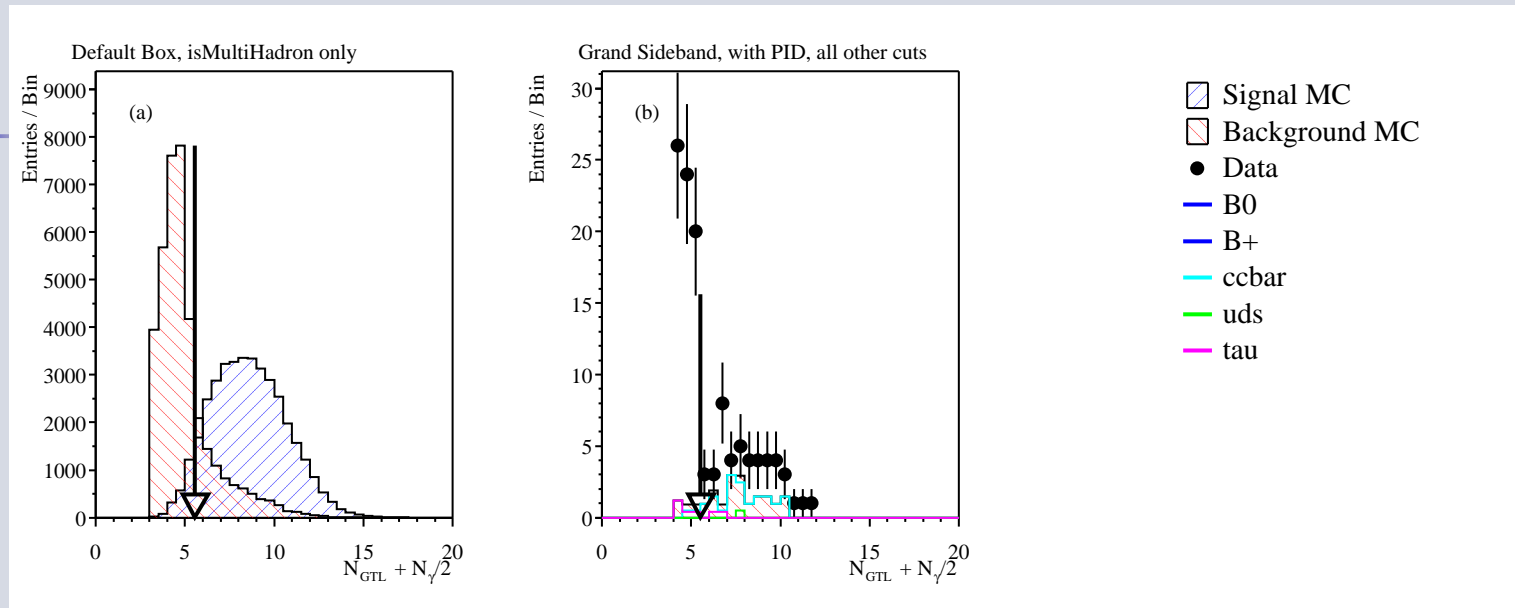


# Un-modeled Processes



$D^{*0} e \nu$  and one remaining electron track

# $B^0 \rightarrow \ell^+ \ell^-$ : QED Background



QED background not modeled in MC. The expectation in the Grand Side Band in data exceeds the MC expectation. (For details see figure 17 and table 8 of BAD 873)

- Muon ID efficiency difference in data and MC

<http://babar-hn.slac.stanford.edu:5090/HyperNews/get/pubboard50/81.html>