

# *Pid Data/MC Comparisons R-18*

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University of South Carolina  
on behalf of the Particle ID Group

2/25/06

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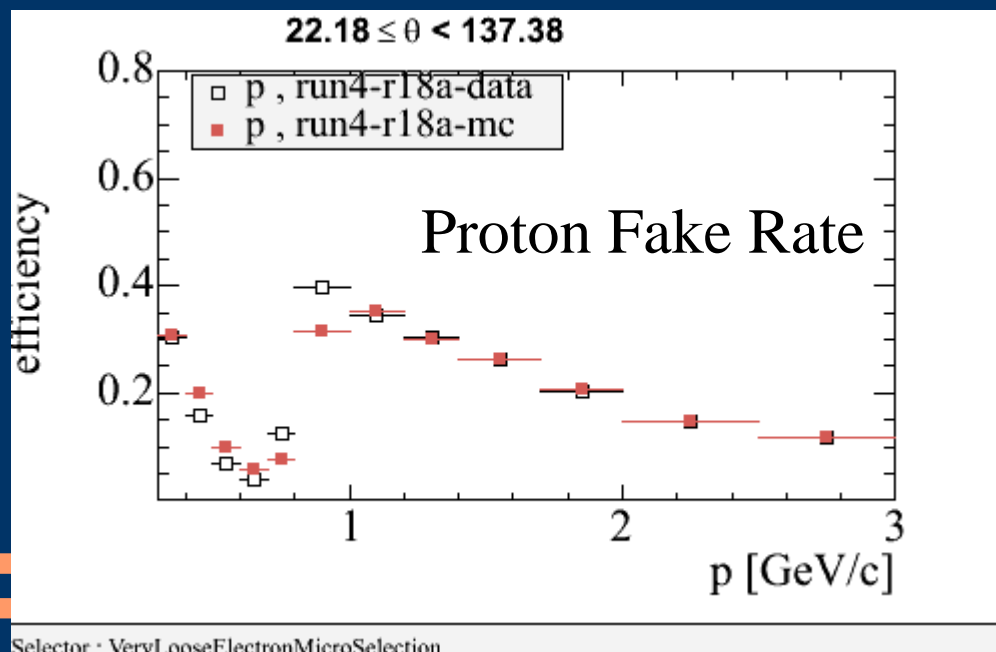
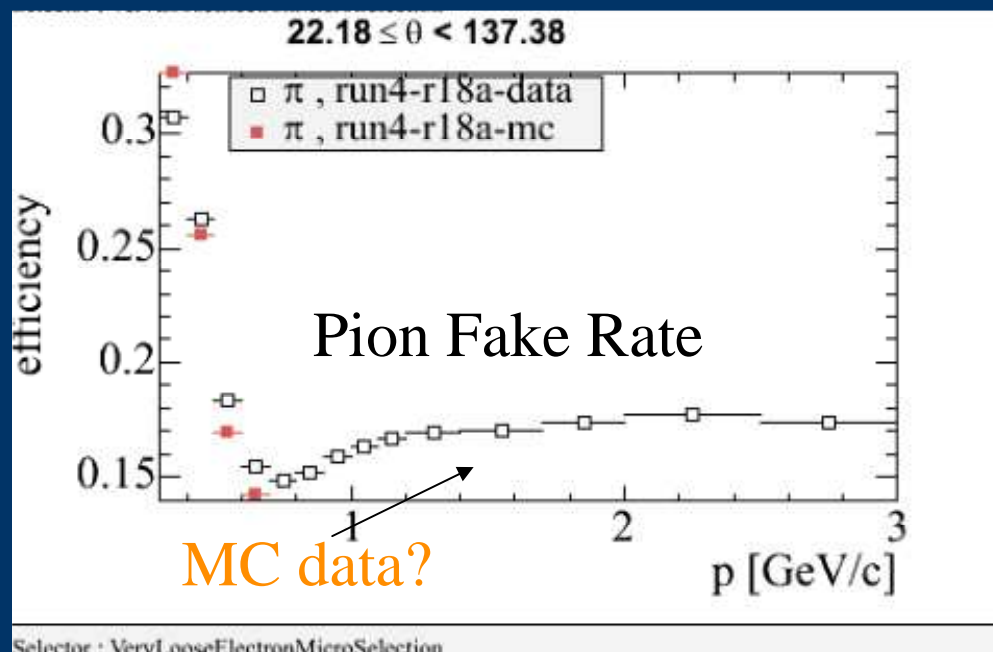
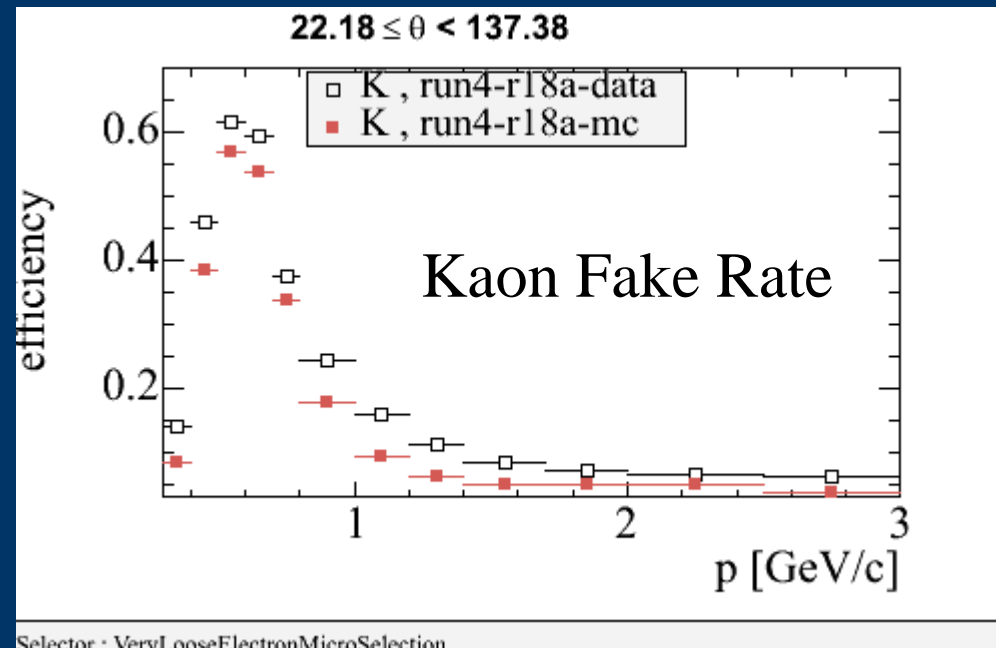
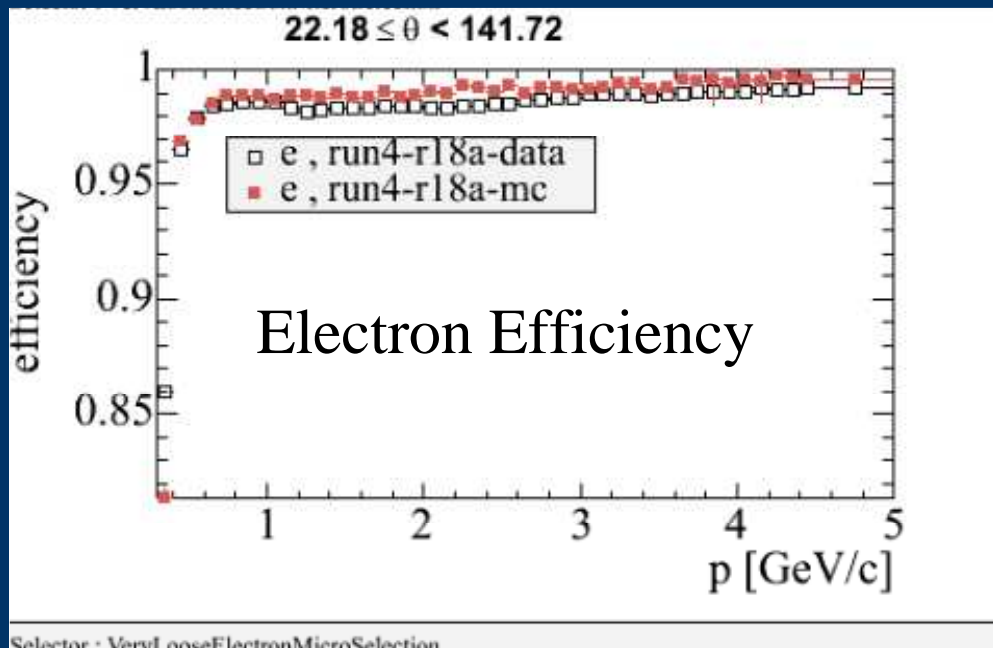
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# Current Status of Pid Comparisons

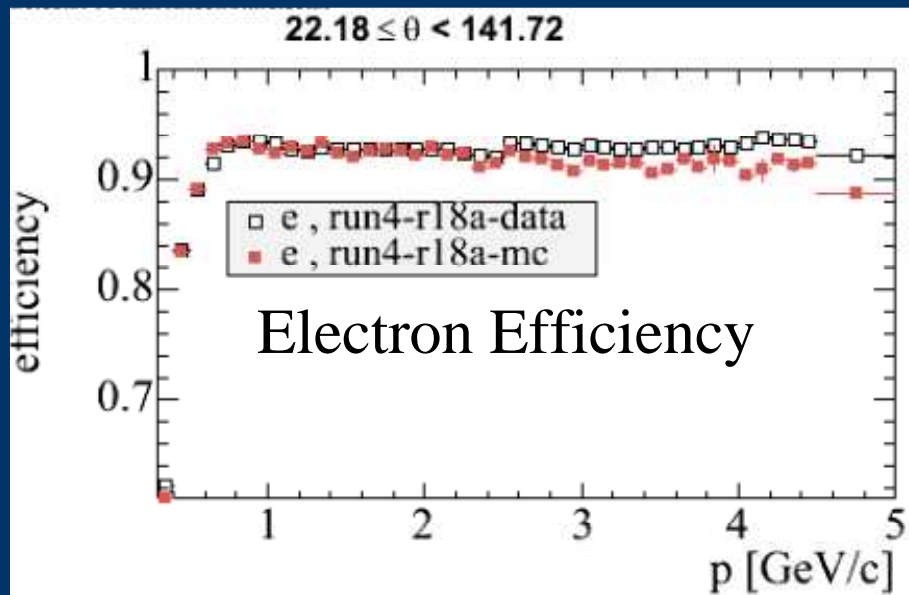
<http://www.slac.stanford.edu/BFROOT/www/Physics/Tools/Pid/PidSelectors/index.html#perf>

- Pid group currently maintains performance plots for Pid selectors in Beta
- For the selectors, a set of efficiency/fake rate plots is created via an automated procedure from the standard Pid Tables
- Available: Analysis-24 (r16a – Pid Tables); Analysis-21, 22, 23 (r14b & r14a PidTables); Analysis-14a;
- Recommended selectors for skims– tighter selection guaranteed to be nested:
  - pLHVeryLoose
  - piLHVeryLoose
  - KLHNotPion
  - muNNVeryLoose
  - eMicroLoose nested with PidLHElectrons
- Currently, no future plans to roll out performance plots of future releases
  - **Lack of Manpower**

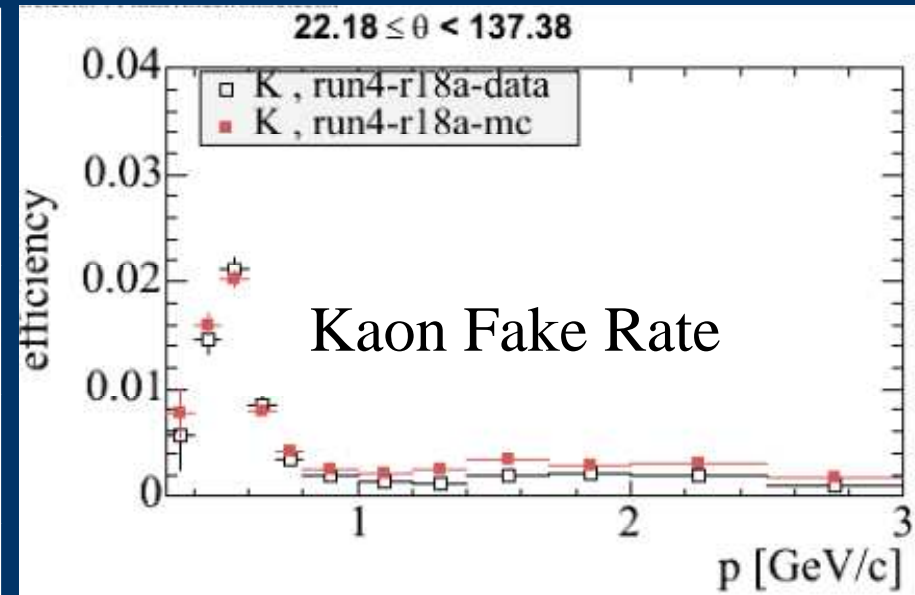
# Electron Micro VeryLoose



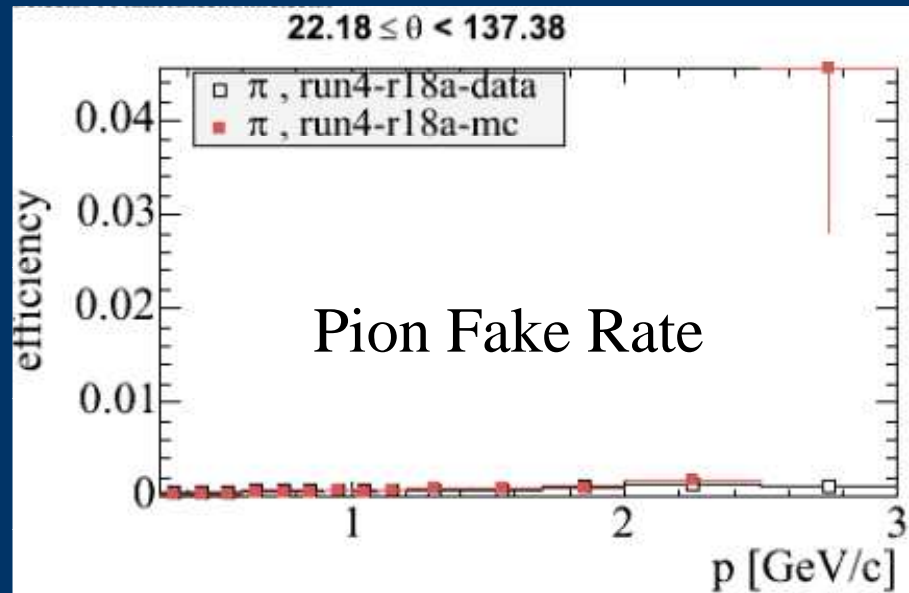
# Pid LH Electron Selector



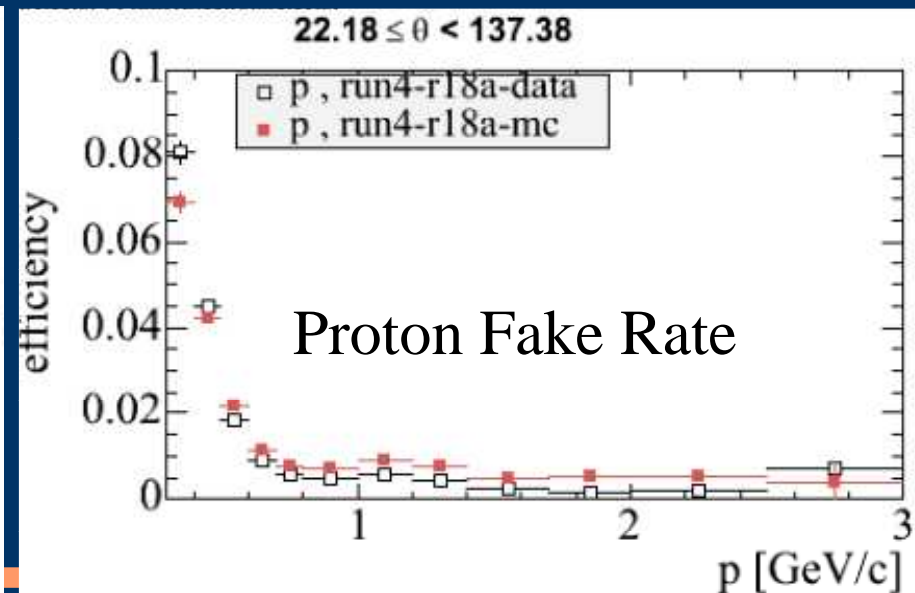
Selector : PidLHElectronSelector



Selector : PidLHElectronSelector

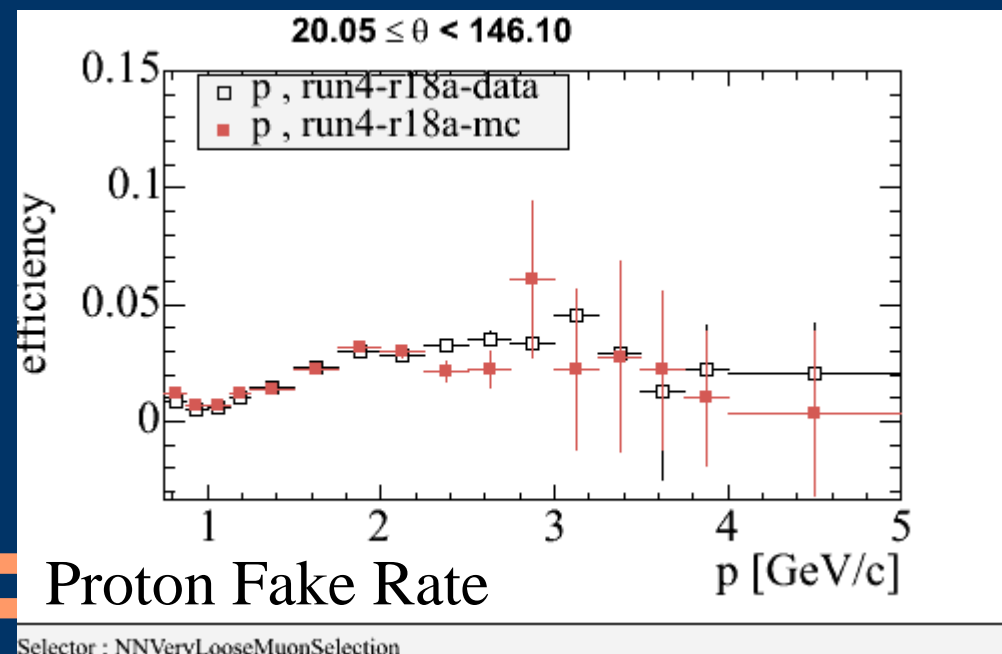
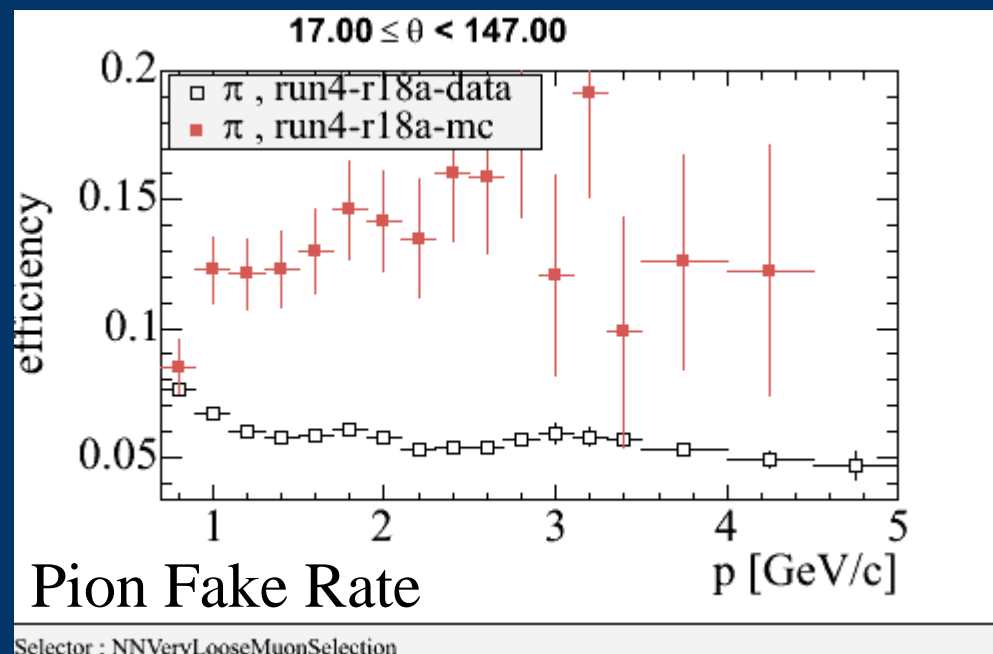
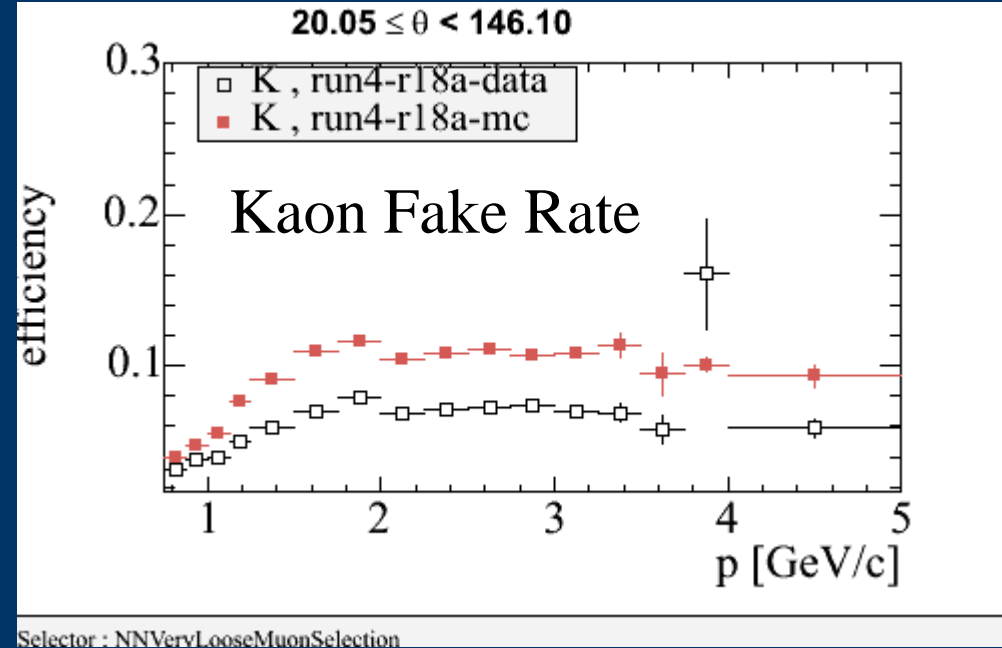
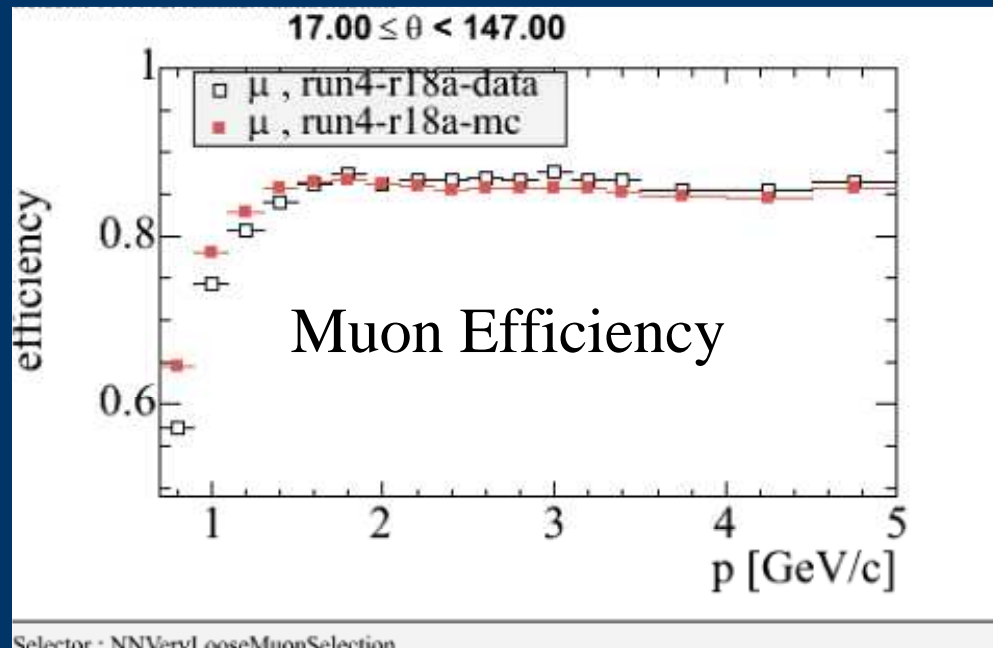


Selector : PidLHElectronSelector

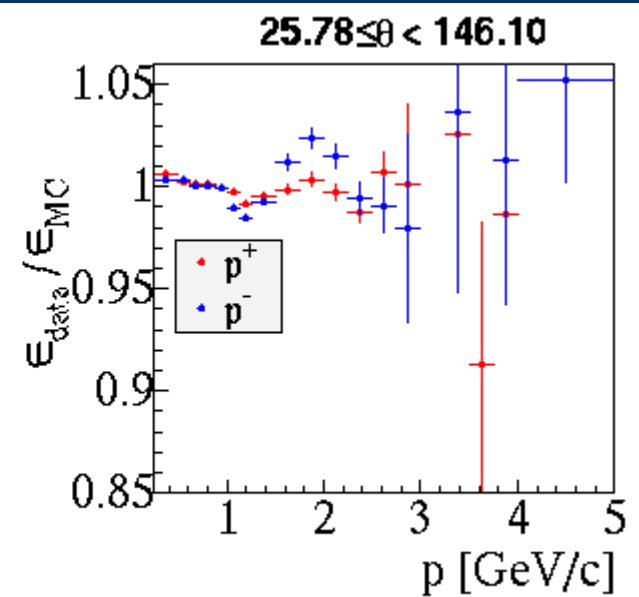
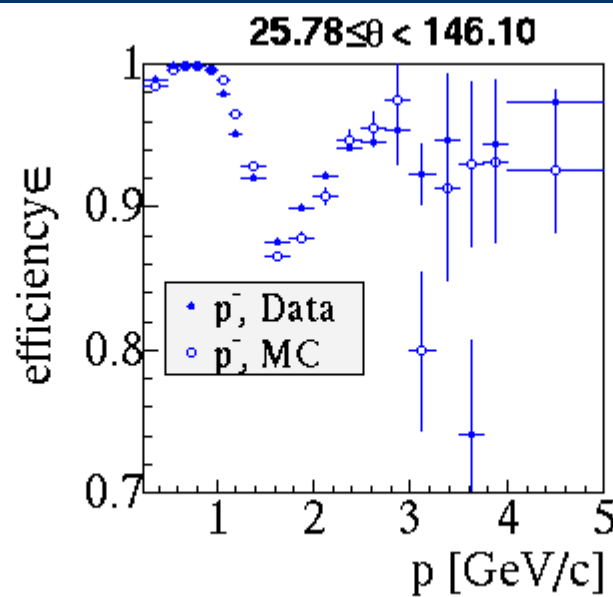
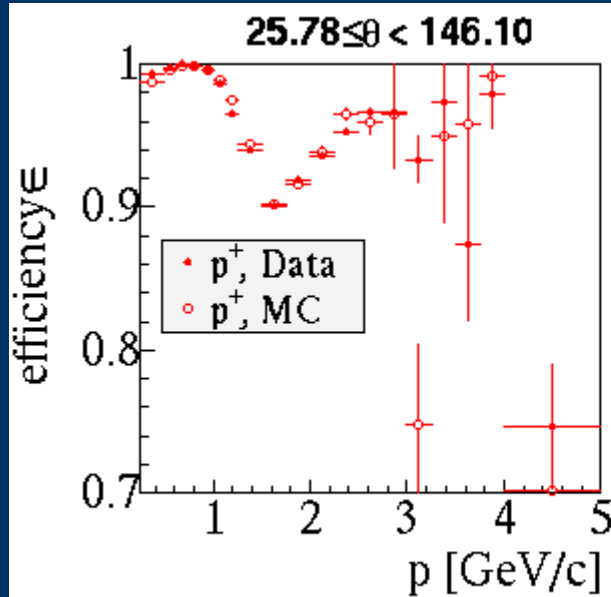


Selector : PidLHElectronSelector

# Muon NN Selectors



# Proton Efficiency

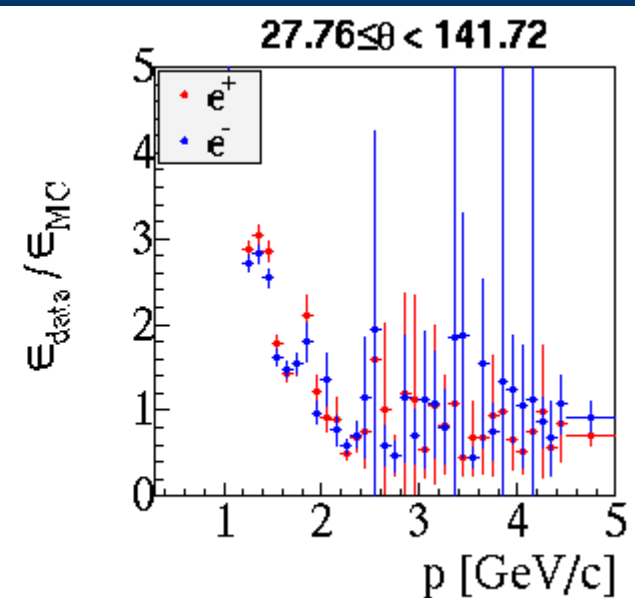
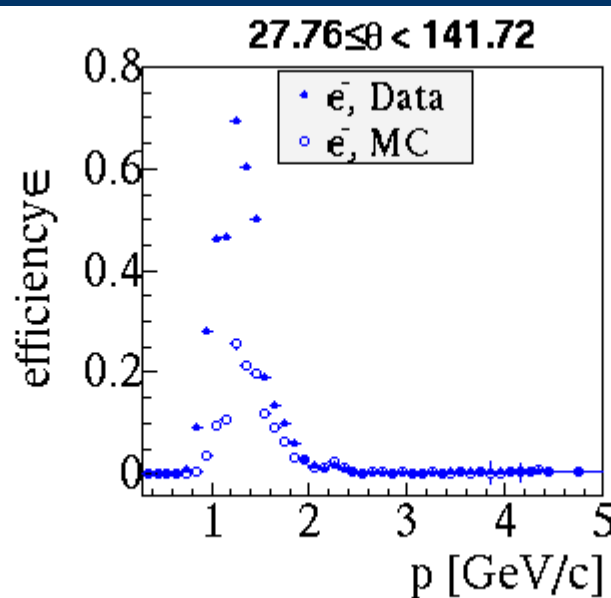
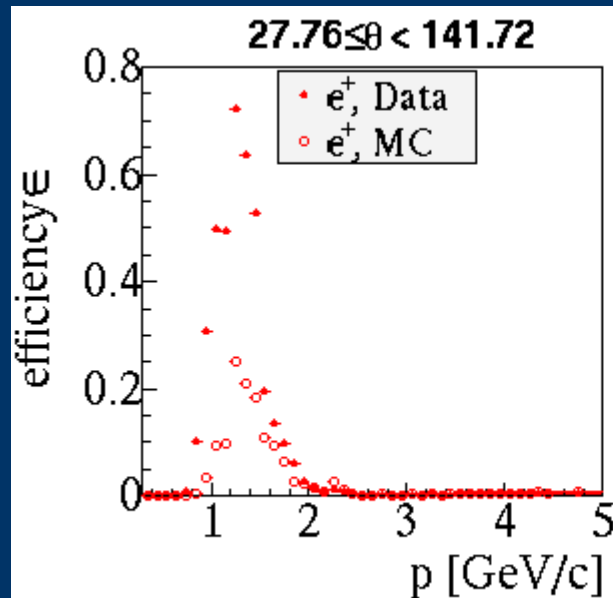


Selector: VeryLooseLHProtonSelection

Dataset: run4-r18a

Tables created on 13/2/2006 (Data), 14/2/2006 (MC)

# Electron Fake Rate

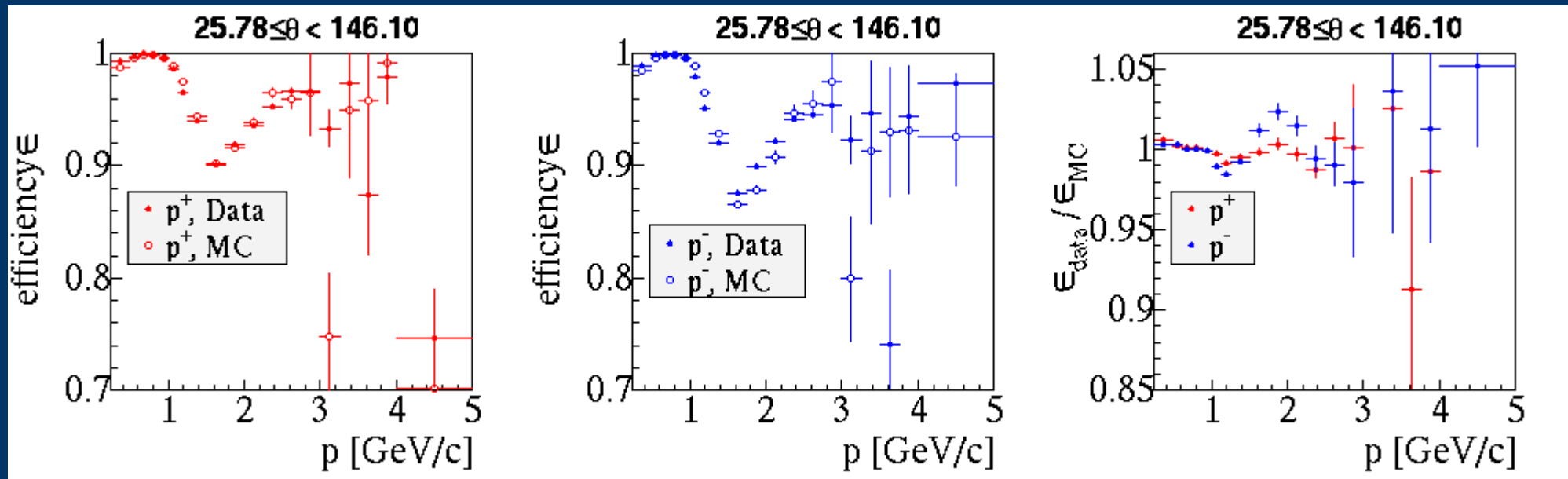


Selector: VeryLooseLHProtonSelection

Dataset: run4-r18a

Tables created on 13/2/2006 (Data), 14/2/2006 (MC)

# Proton Efficiency

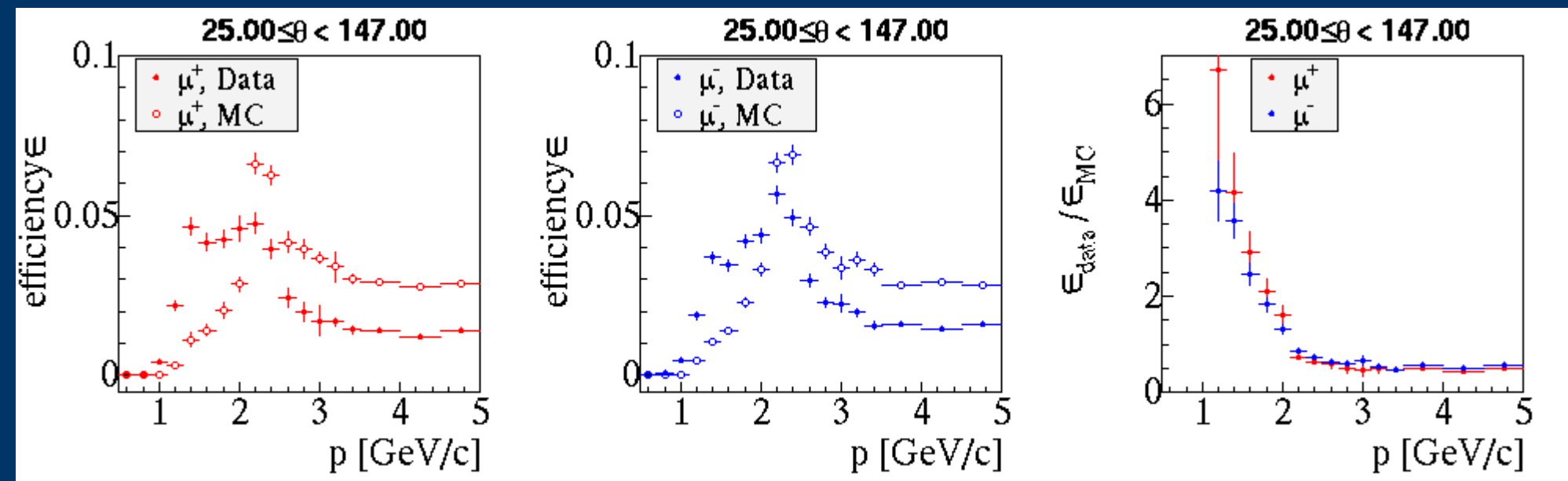


Selector: VeryLooseLHProtonSelection

Dataset: run4-r18a

Tables created on 13/2/2006 (Data), 14/2/2006 (MC)

# Muon Fake Rate

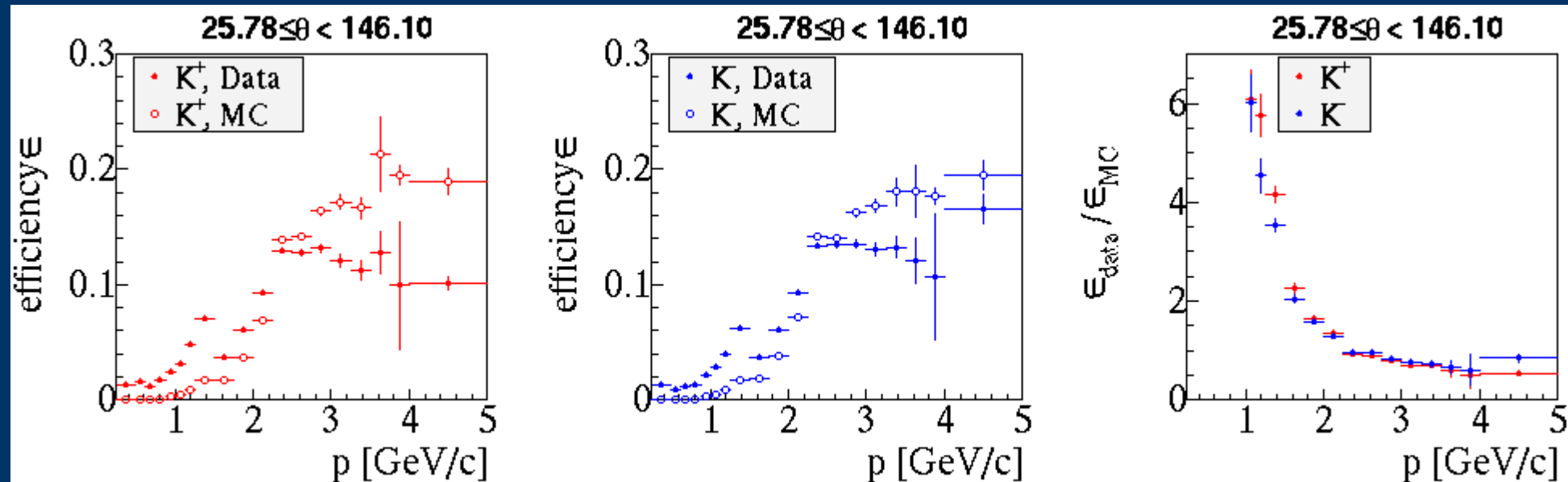


Selector: VeryLooseLHProtonSelection

Dataset: run4-r18a

Tables created on 13/2/2006 (Data), 14/2/2006 (MC)

# Kaon Fake Rate for Proton LH VeryLoose

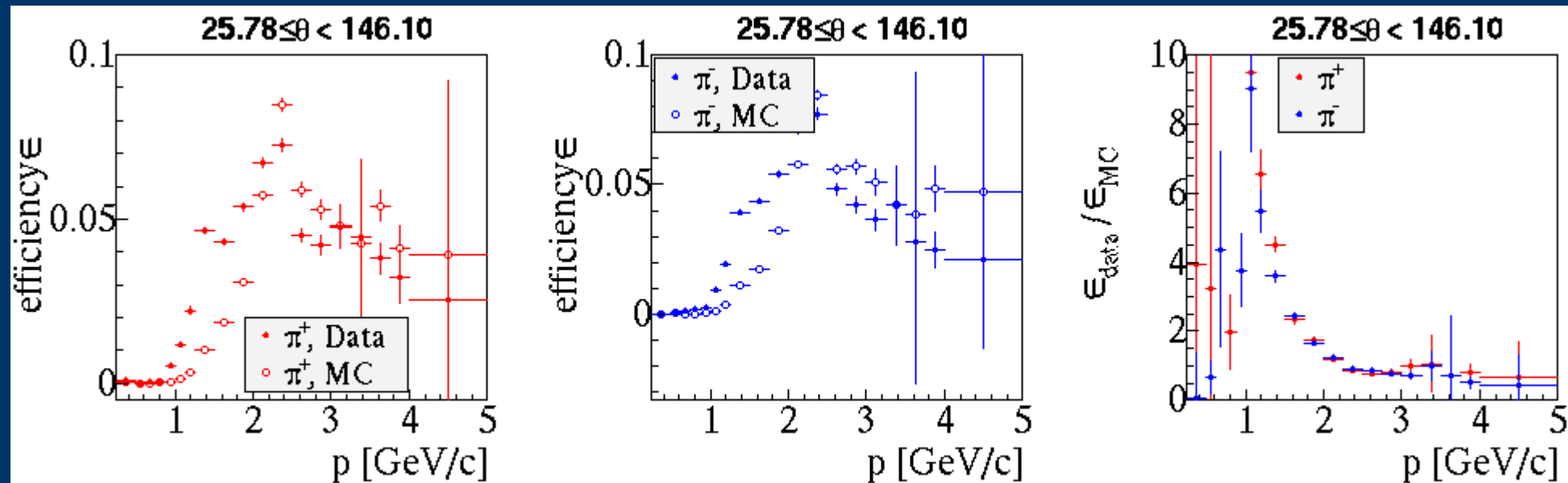


Selector: VeryLooseLHProtonSelection

Dataset: run4-r18a

Tables created on 13/2/2006 (Data), 14/2/2006 (MC)

# Pion Fake Rate




Selector: VeryLooseLHProtonSelection

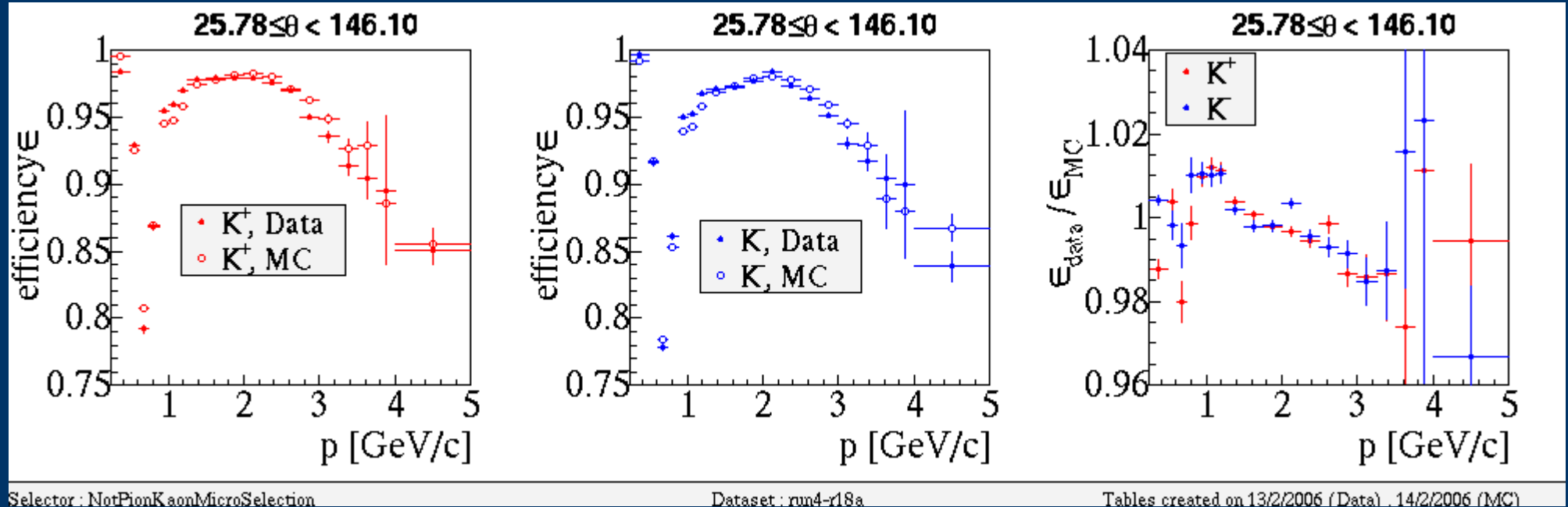
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Tables created on 13/2/2006 (Data), 14/2/2006 (MC)

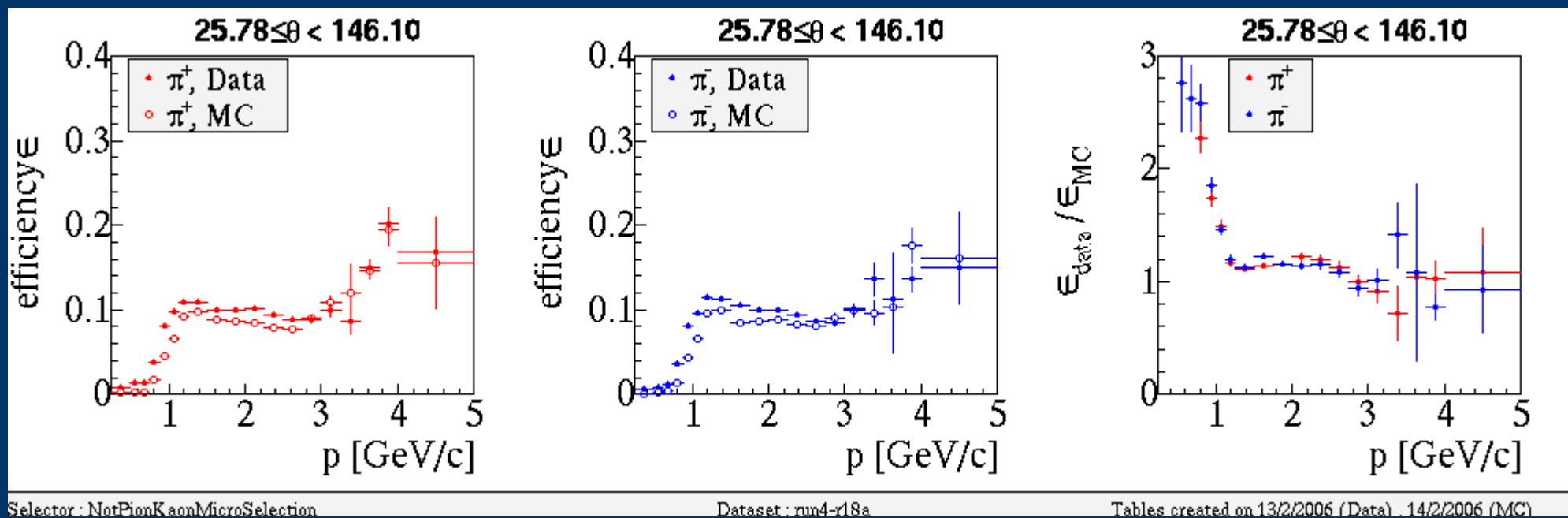
# Summary of electron, muon and proton selectors

- Electron efficiency and fake rates have good agreement
    - Pion fake rate for eMicro not evident above 0.5 GeV/c
    - Opposite behavior of MC in PidLH selector (below data)
  - Muon efficiency has good agreement, but kaon and pion fake rates have poor agreement. Pion fake rates also have large errors.
  - Proton efficiency has good agreement. Fake rates agree below 1 GeV/c.
    - Electron fake rates in data spike at low proton efficiency. MC fake rates not nearly as large.
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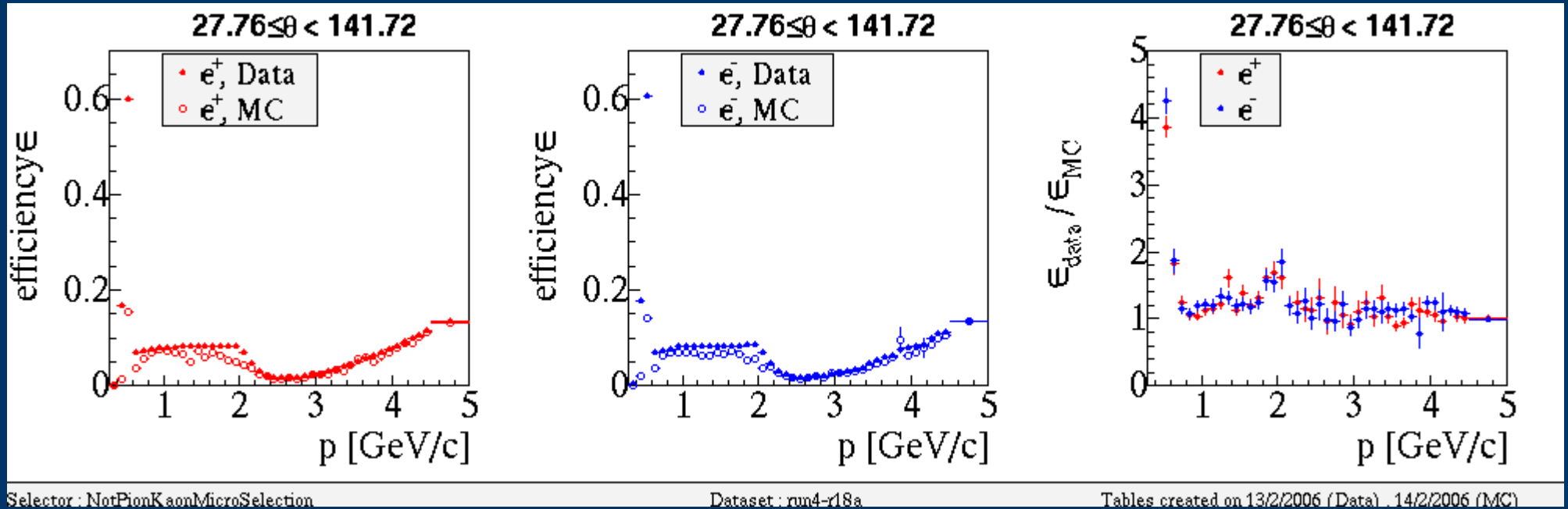
# Not Pion Kaon Micro Efficiency



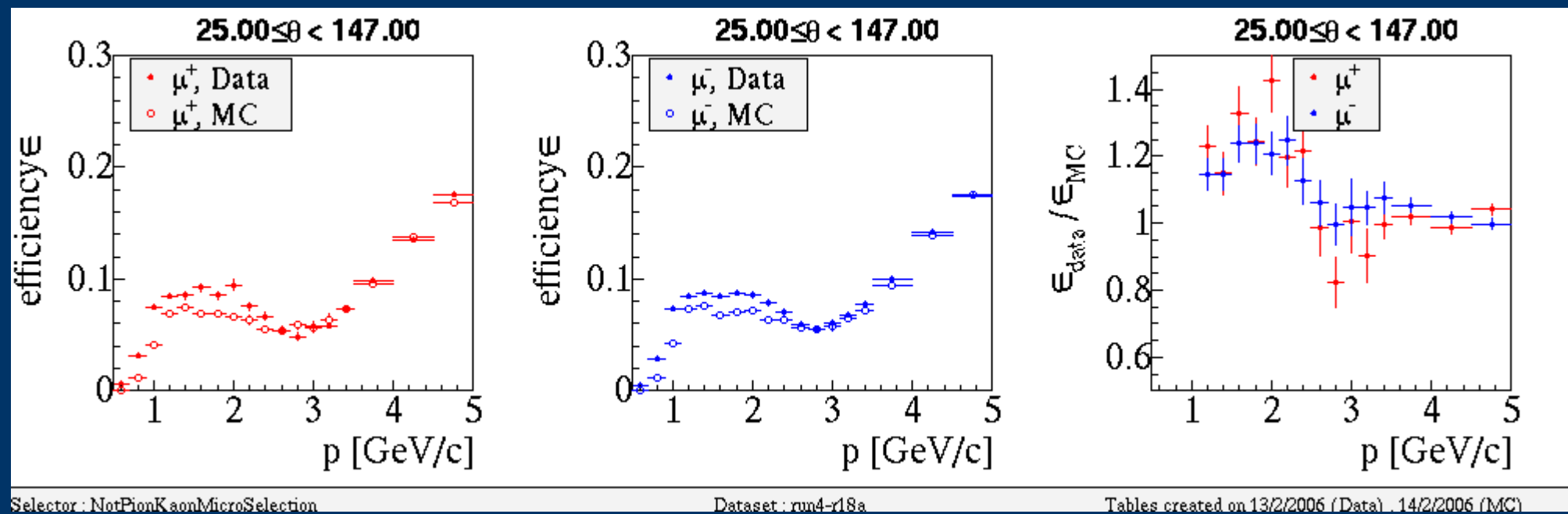
# Pion Fake Rate



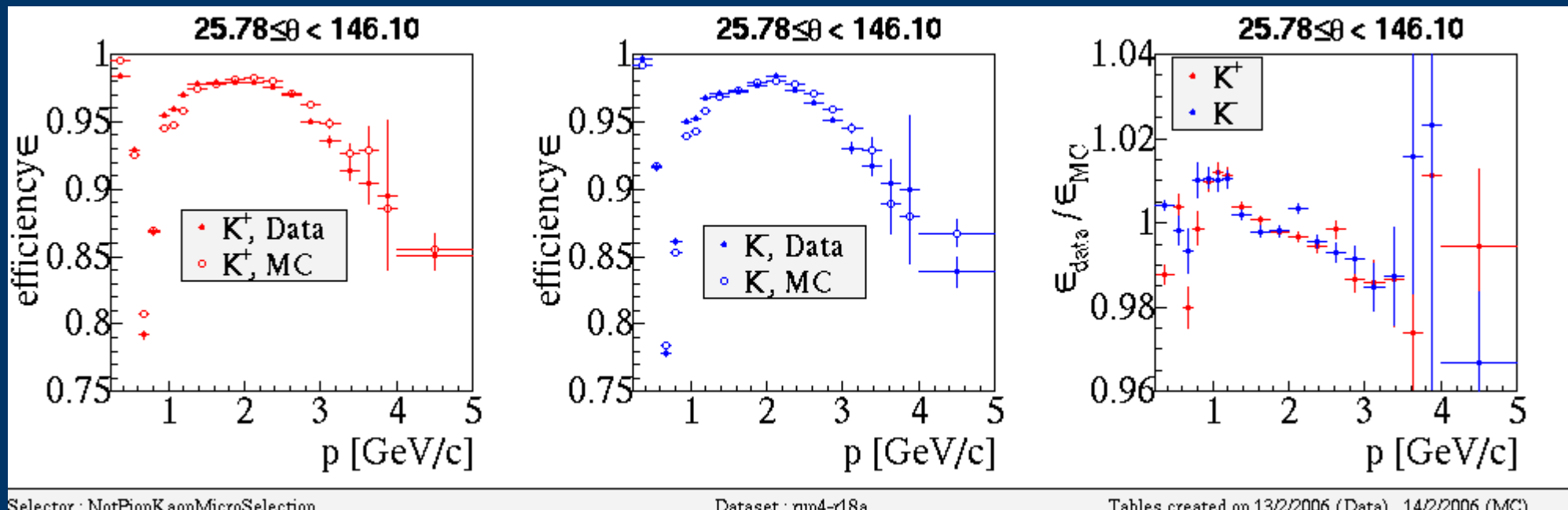
# Electron Fake Rate



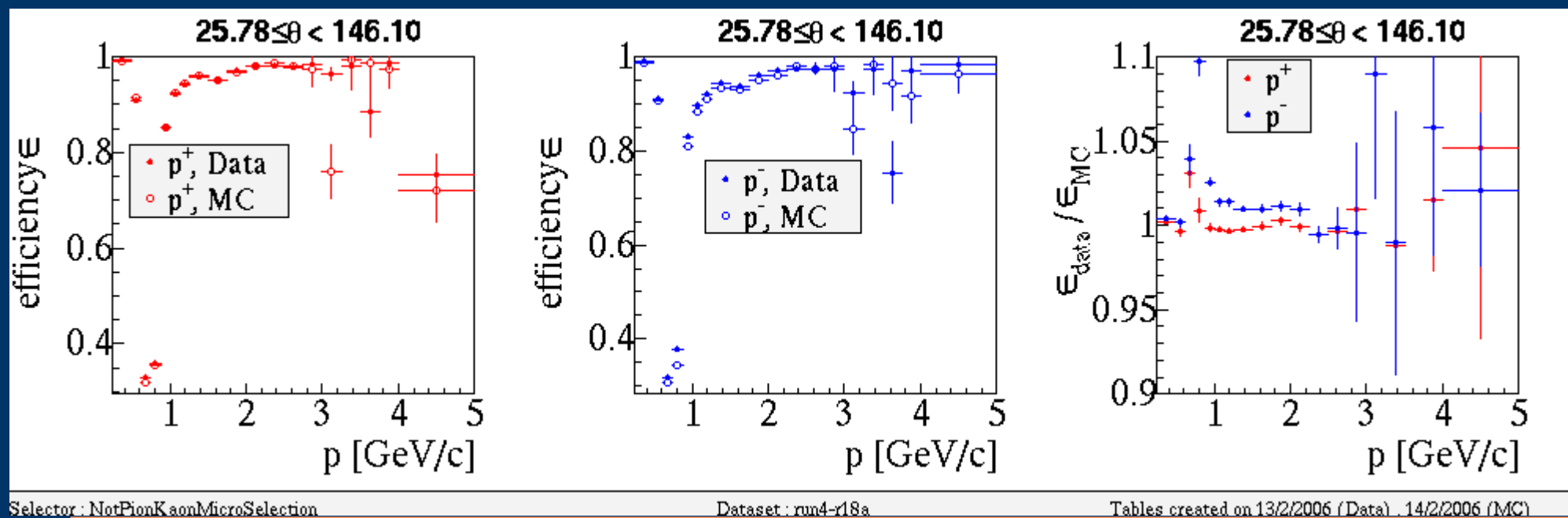
# Muon Fake Rate



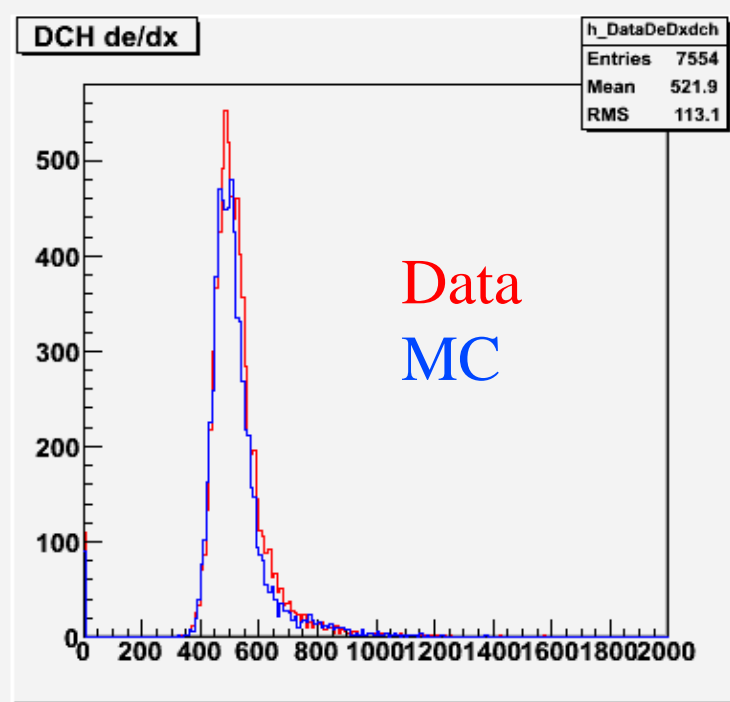
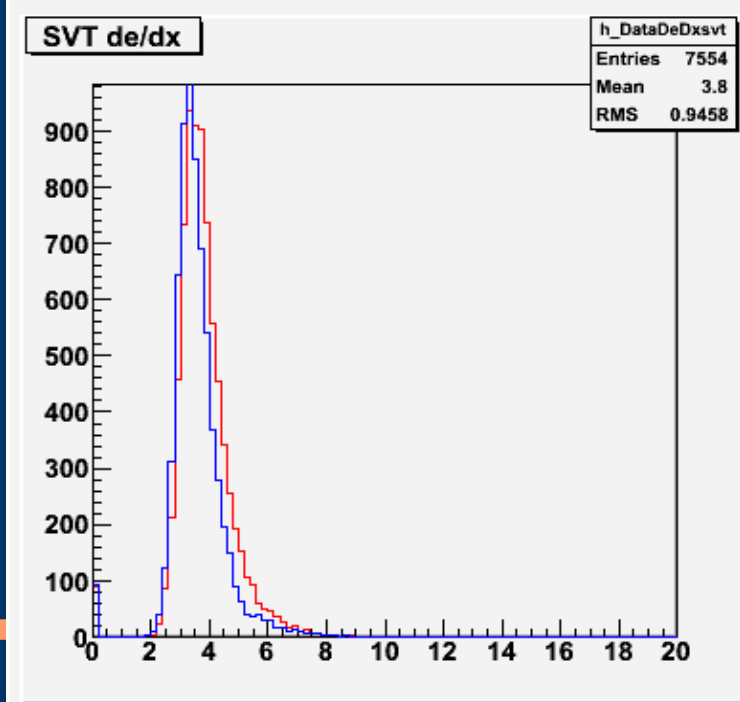
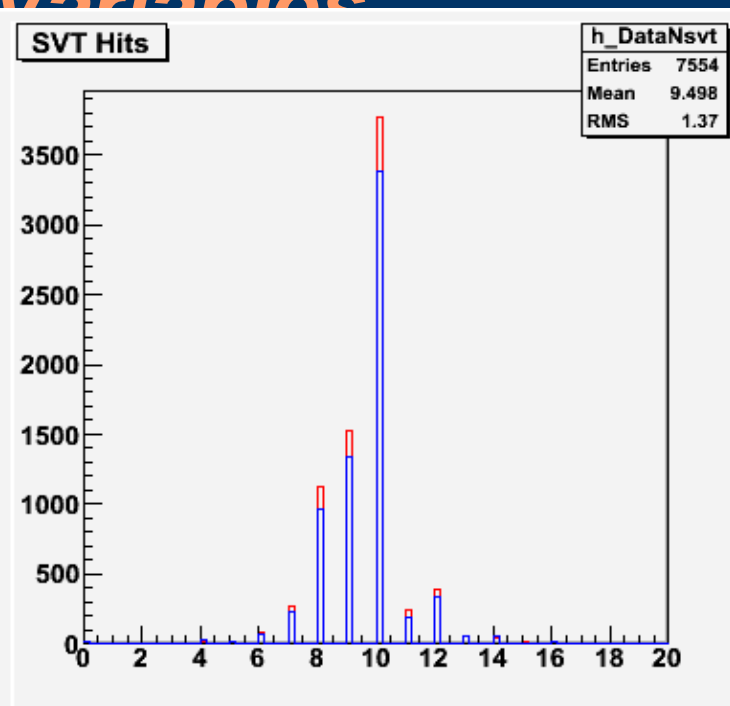
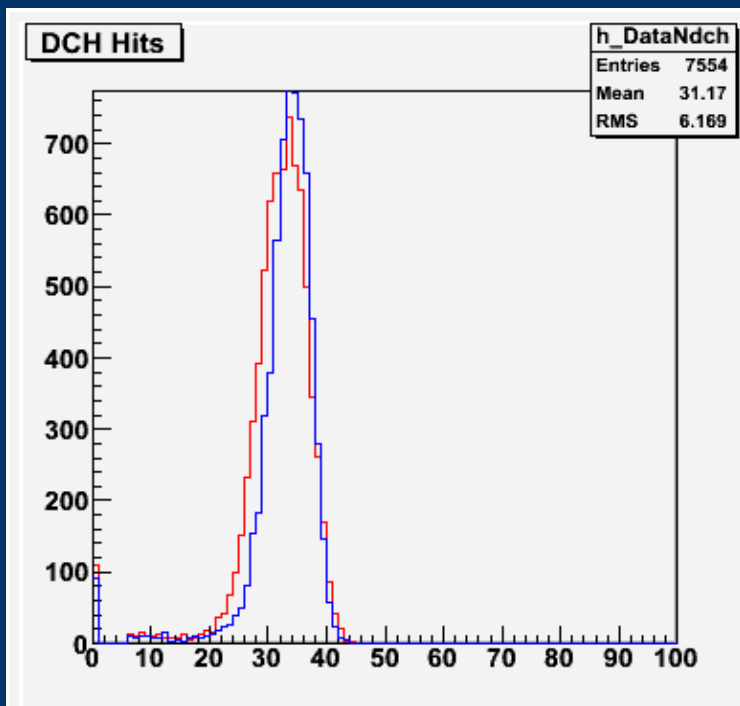
# Not Pion Kaon Micro Efficiency

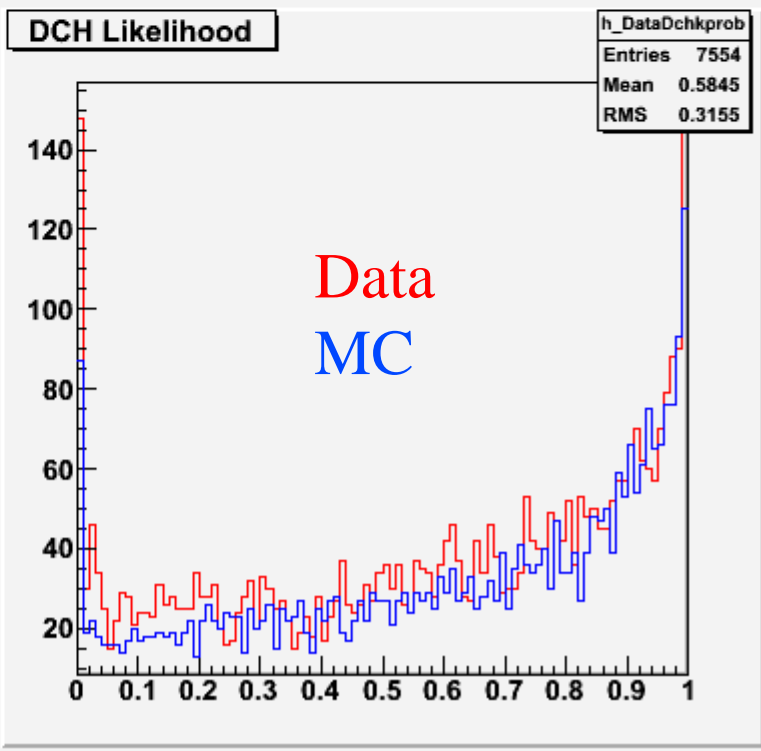
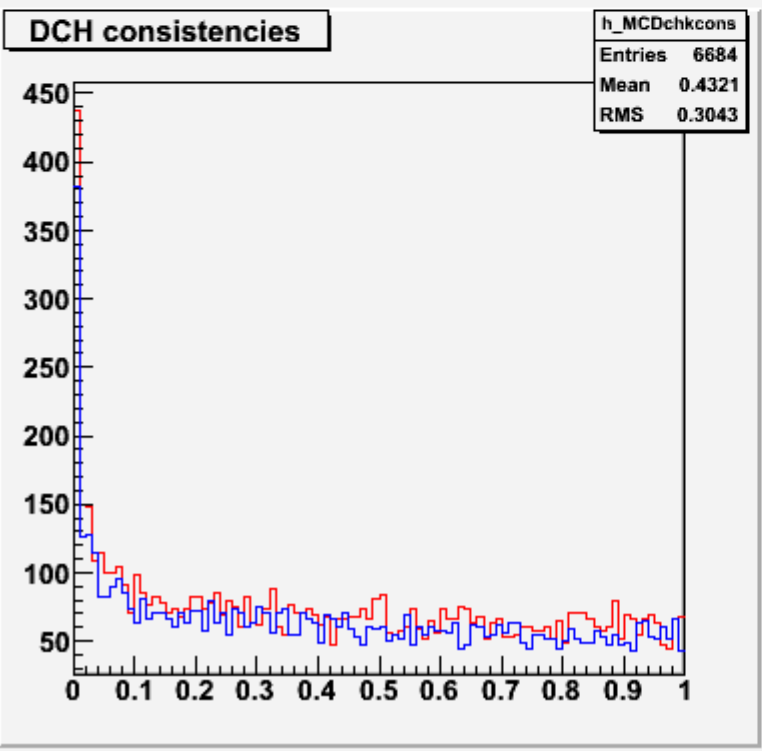
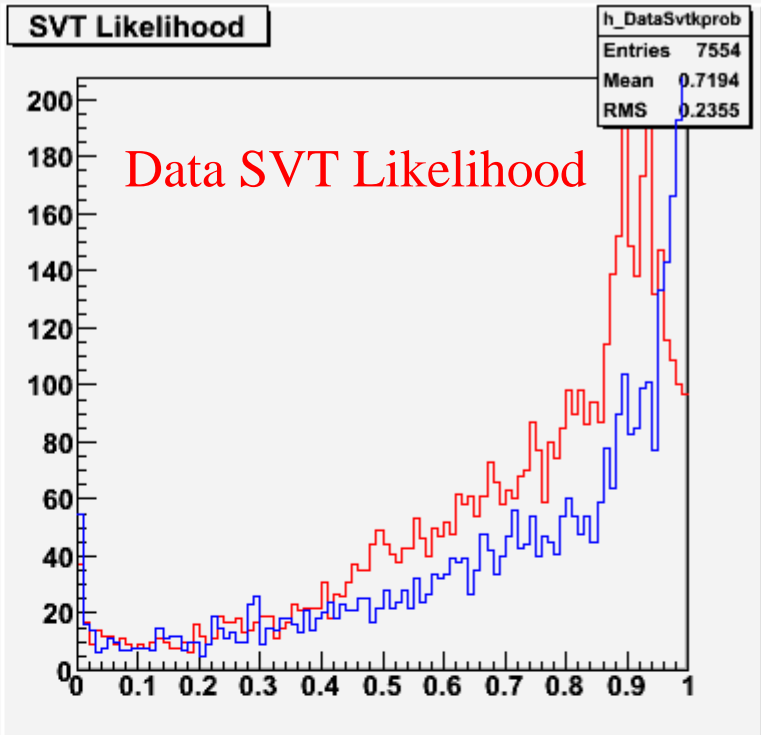
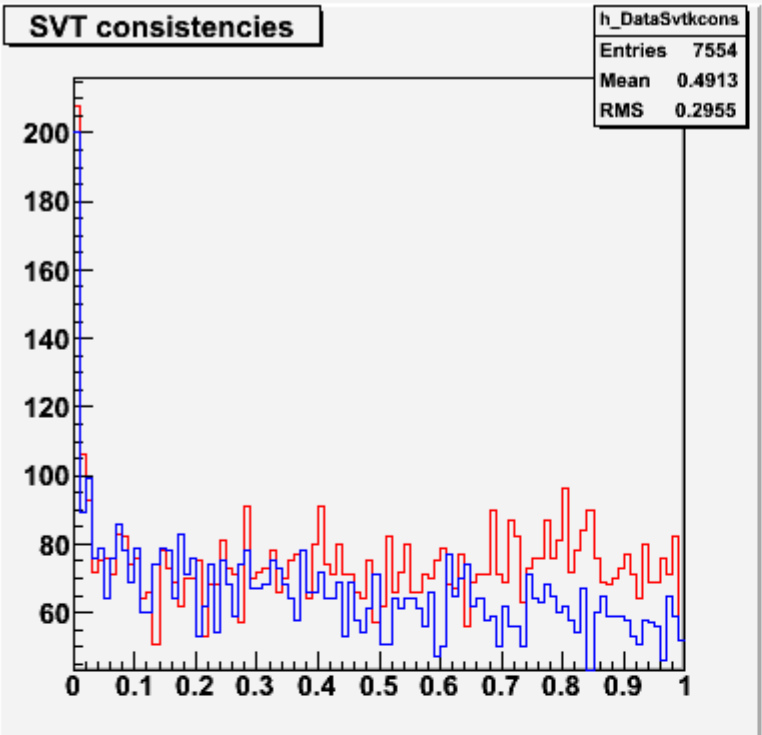


# Proton Fake Rate

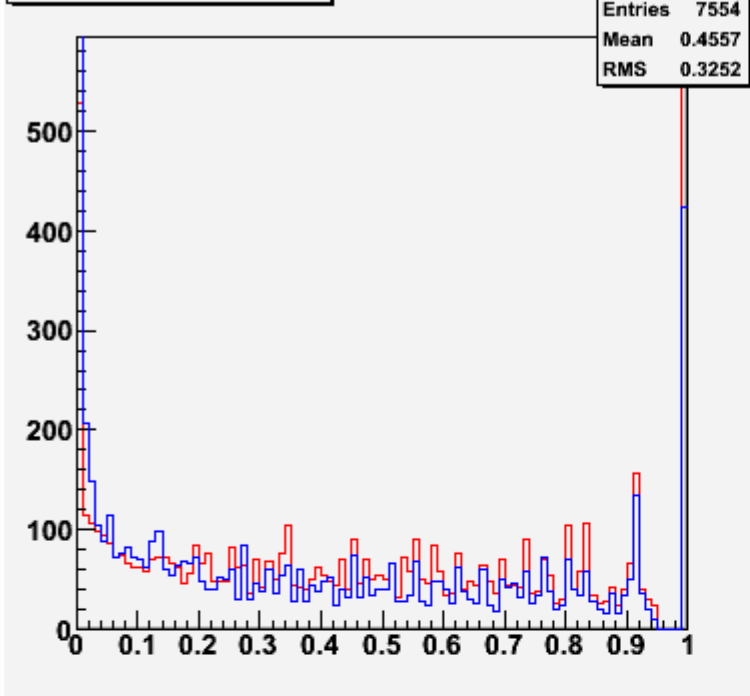


# Kaon $D^+$ $D^0\pi_s$ $K^-\pi^+$ Discriminating Variables

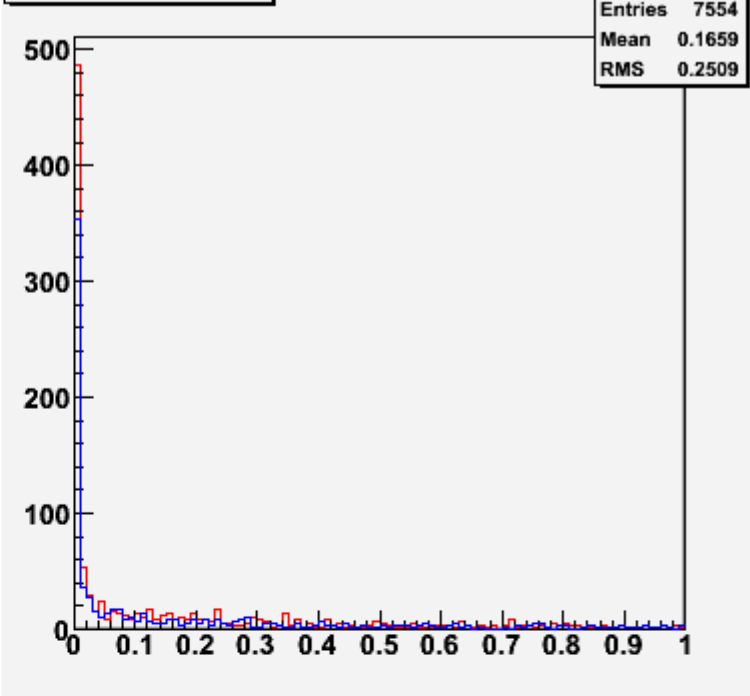




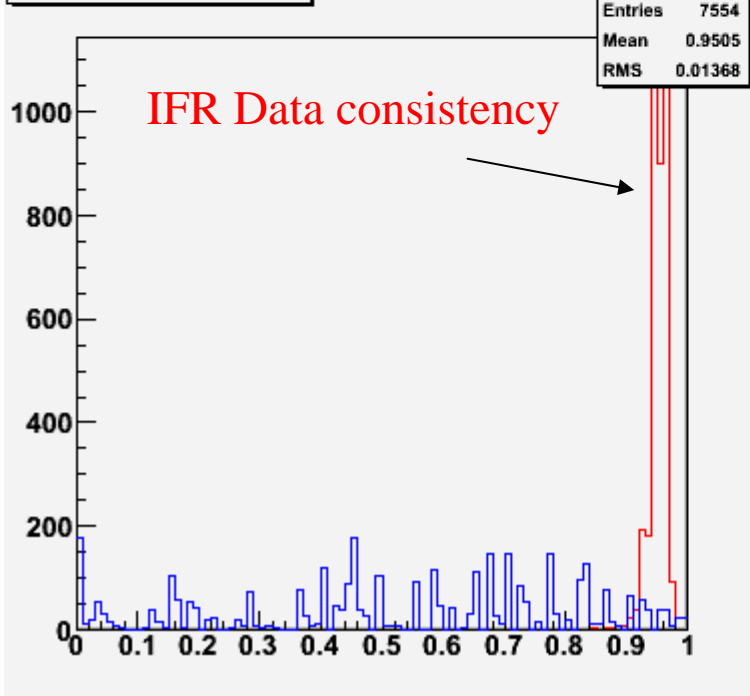
DRC consistencies



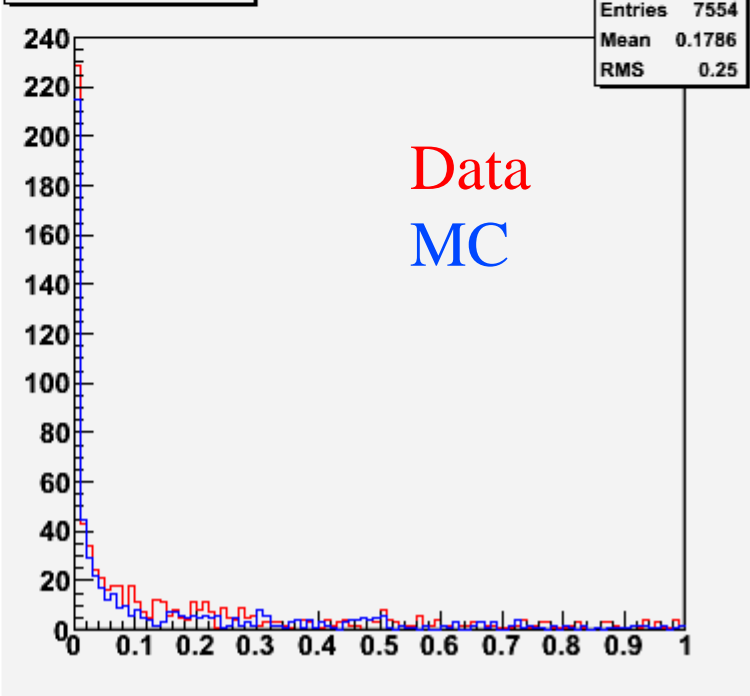
DRC Likelihood



IFR consistencies



IFR Likelihood



# Kaon discriminating variables

- The kaon ifr consistency (computed in OPR) has completely different shape from MC
  - DCH hit range is slightly lower in data
  - Kaon likelihood from the SVT is shifted away from 1 in the data but not in MC
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# Concluding Remarks

- Data/MC comparison plots are produced from an automated procedure – requires manpower
  - Pid Data/MC Ntuples and Pid Tables are available for use
  - Scripts, root macros, and TPidTable to produce plots are available
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