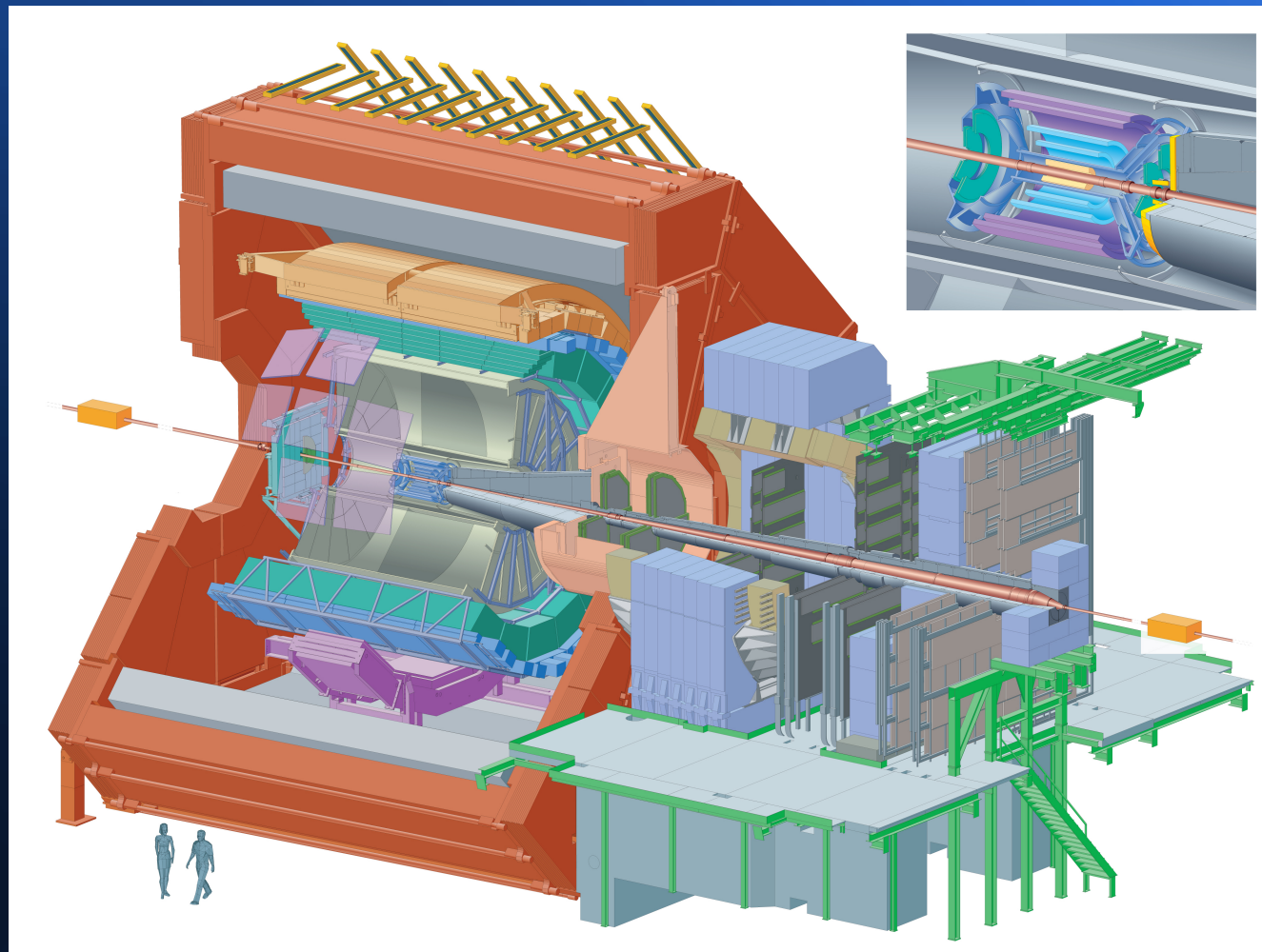


Data Checks and Spectra Studies in ALICE

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Advisors: Michele Floris, Alexander Kalweit



The ALICE Detector
Image: CERN



The Quark-Gluon Plasma – What, Where, & How

- State of matter in which quarks are no longer confined in hadrons
- The early universe is thought to have existed as a QGP from $\sim 10^{-12}$ to $\sim 10^{-6}$ s after the Big Bang
- The LHC is able to produce QGPs in Pb-Pb collisions

The Quark-Gluon Plasma - Why

Studying the QGP may help us understand:

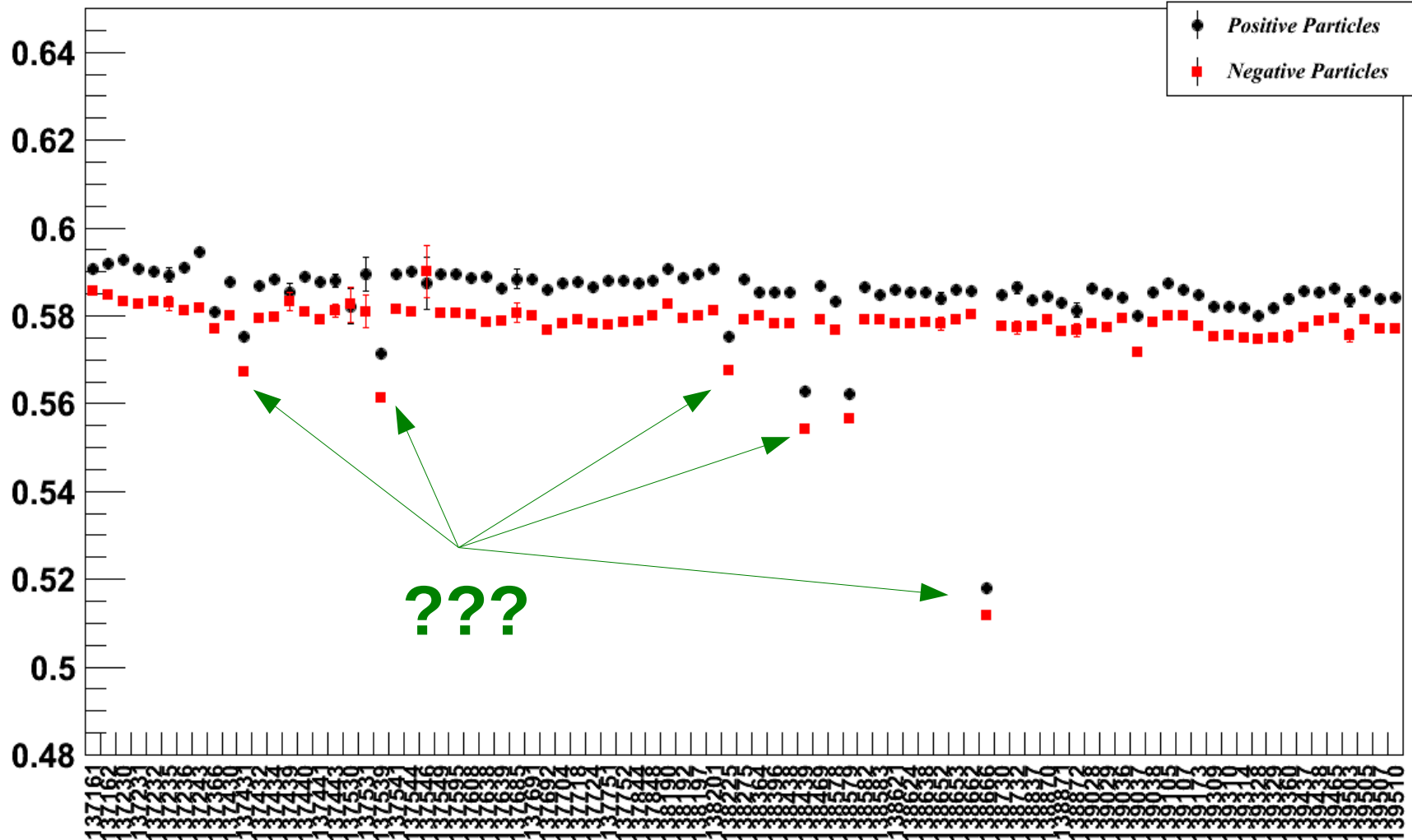
- The strong force
- The QCD phase diagram
 - This is the only Standard Model phase transition that can be studied in the laboratory!
- The early universe
- The hadronic contents of the universe today

My Work So Far

- Until now, analysis done on ESDs
 - Computationally inefficient
 - Contain too much information
- Migrating to AODs
 - Contain only most important info
 - Needed to be checked for quality
 - Done mostly by plotting stable quantities as a function of the run number

Possible Bad Runs:

TOF Matching Efficiency at $p_T = 0.9 \text{ GeV/c}$



Converting to # of standard deviations:

TOF Matching Efficiency at $p_T = 0.9 \text{ GeV/c}$

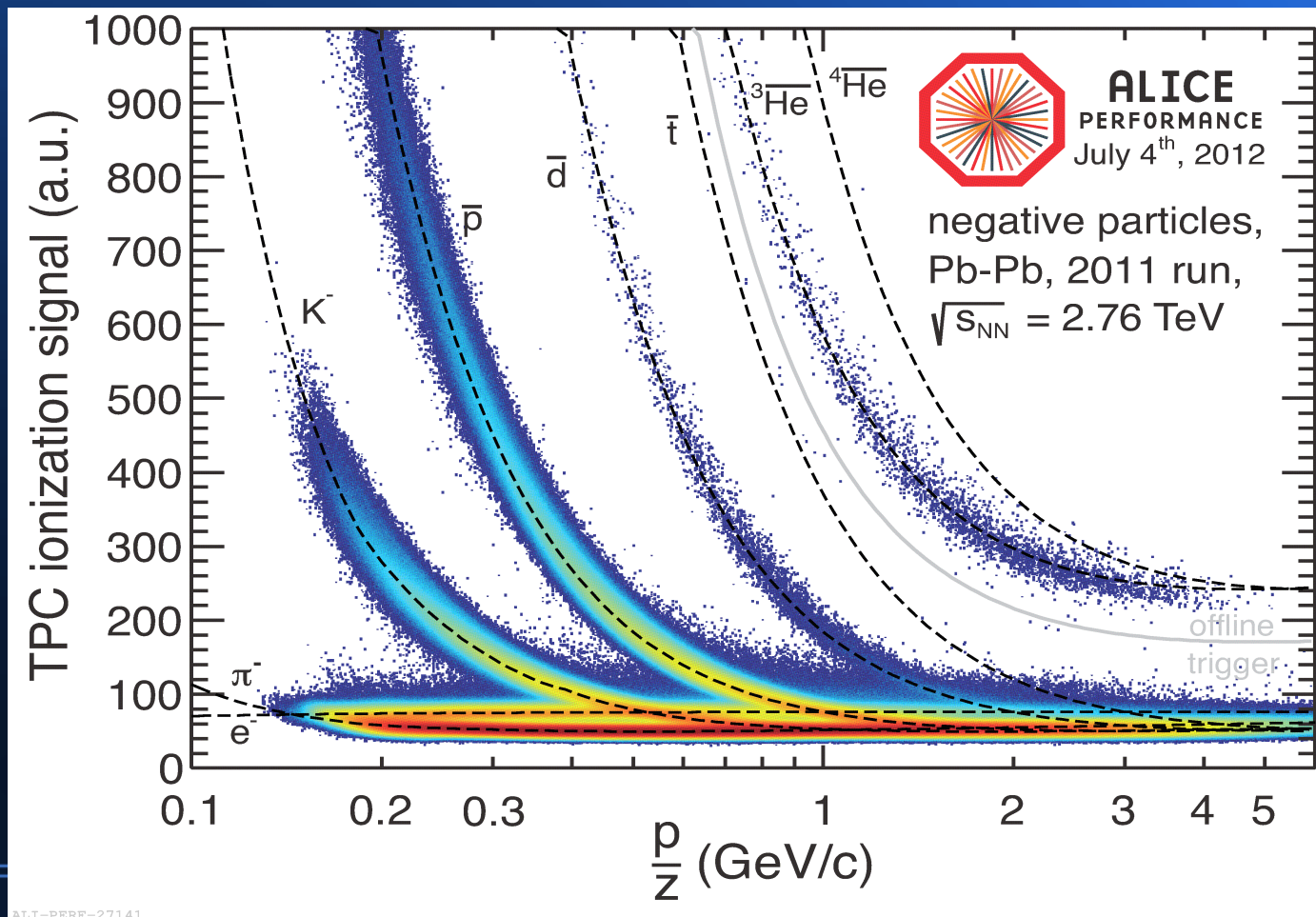


What's Next: π , K , p Spectra

- Identified particle spectra contain several pieces of information
- Spectra measurements depend on efficiency corrections
 - $\# \text{ Produced} = \# \text{ Detected} / \text{Efficiency}$
- Currently using Monte Carlo information for these corrections
 - Unreliable, problems
- My task: recalculate efficiency using a more MC-independent method

π , K , p Spectra: Efficiency Corrections

- Idea for more MC-independent efficiency calculation: dE/dx curves

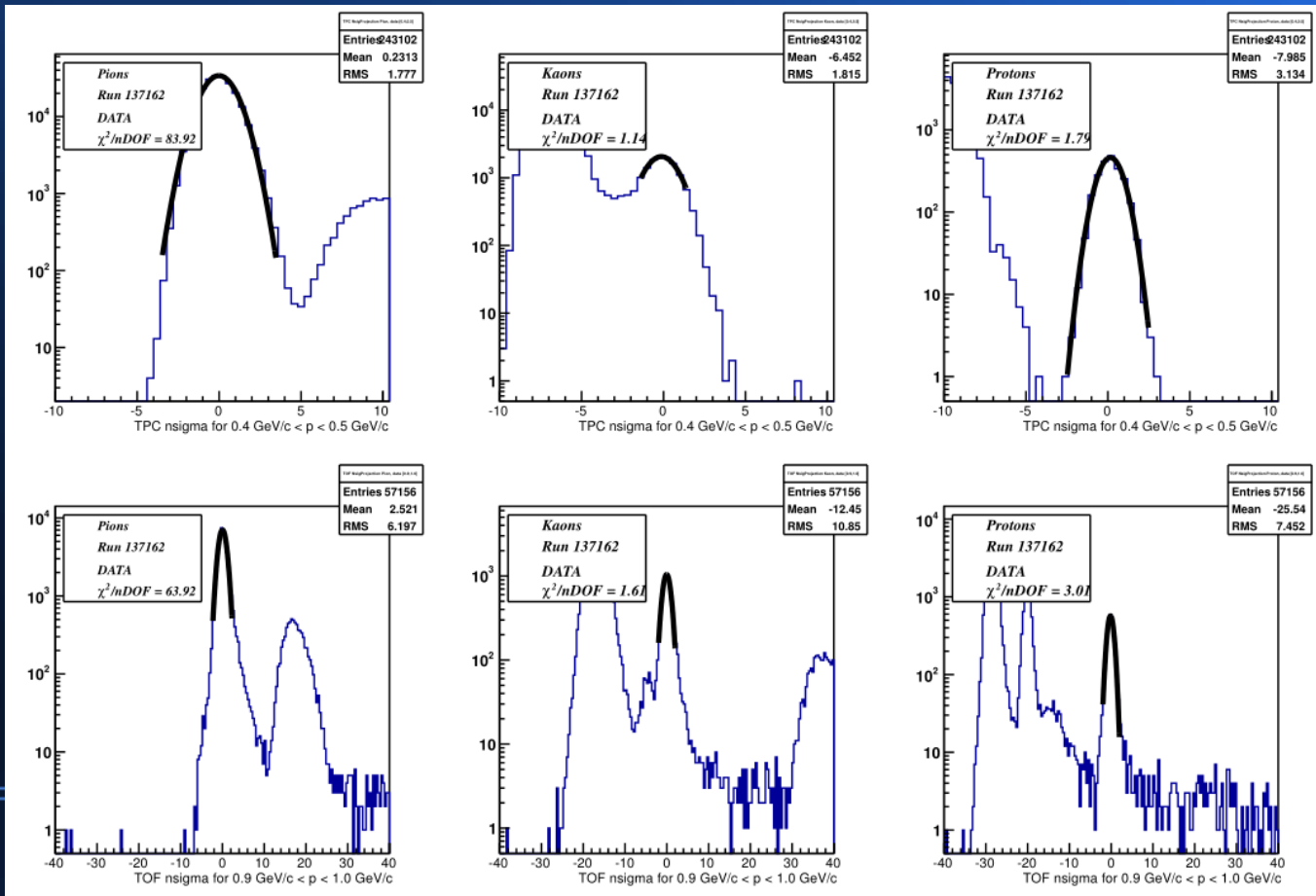


ALI-PERF-27143

Image: ALICE Collaboration

π , K , p Spectra: Efficiency Corrections

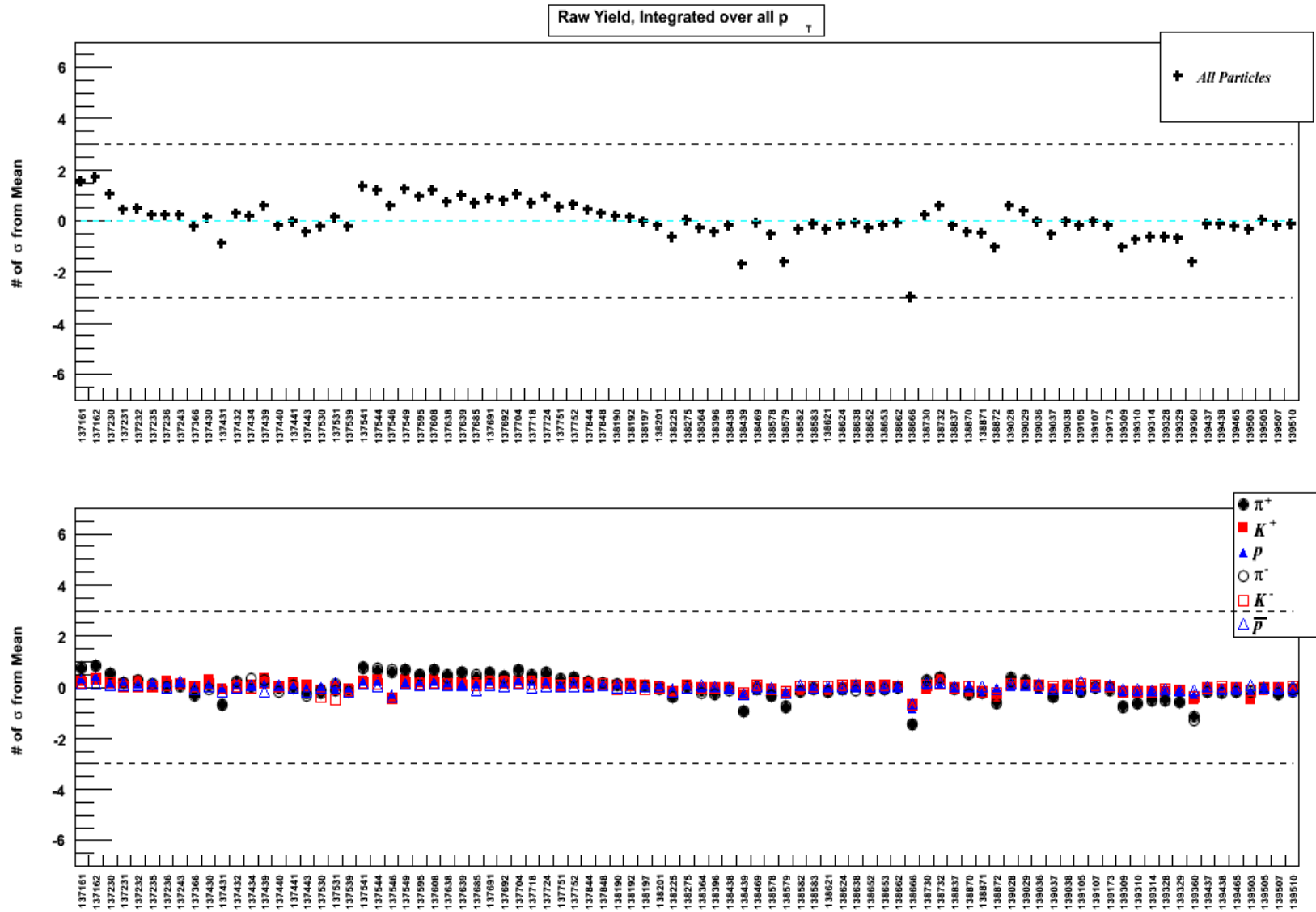
- For fixed vertical slices, these dE/dx curves are (almost) Gaussian
- Identify particles within 3 sigma of a peak (99.7%)
- Multiply by correction factor to account for rejected particles
- Still have to Monte Carlo for other corrections (secondaries, decays, etc)



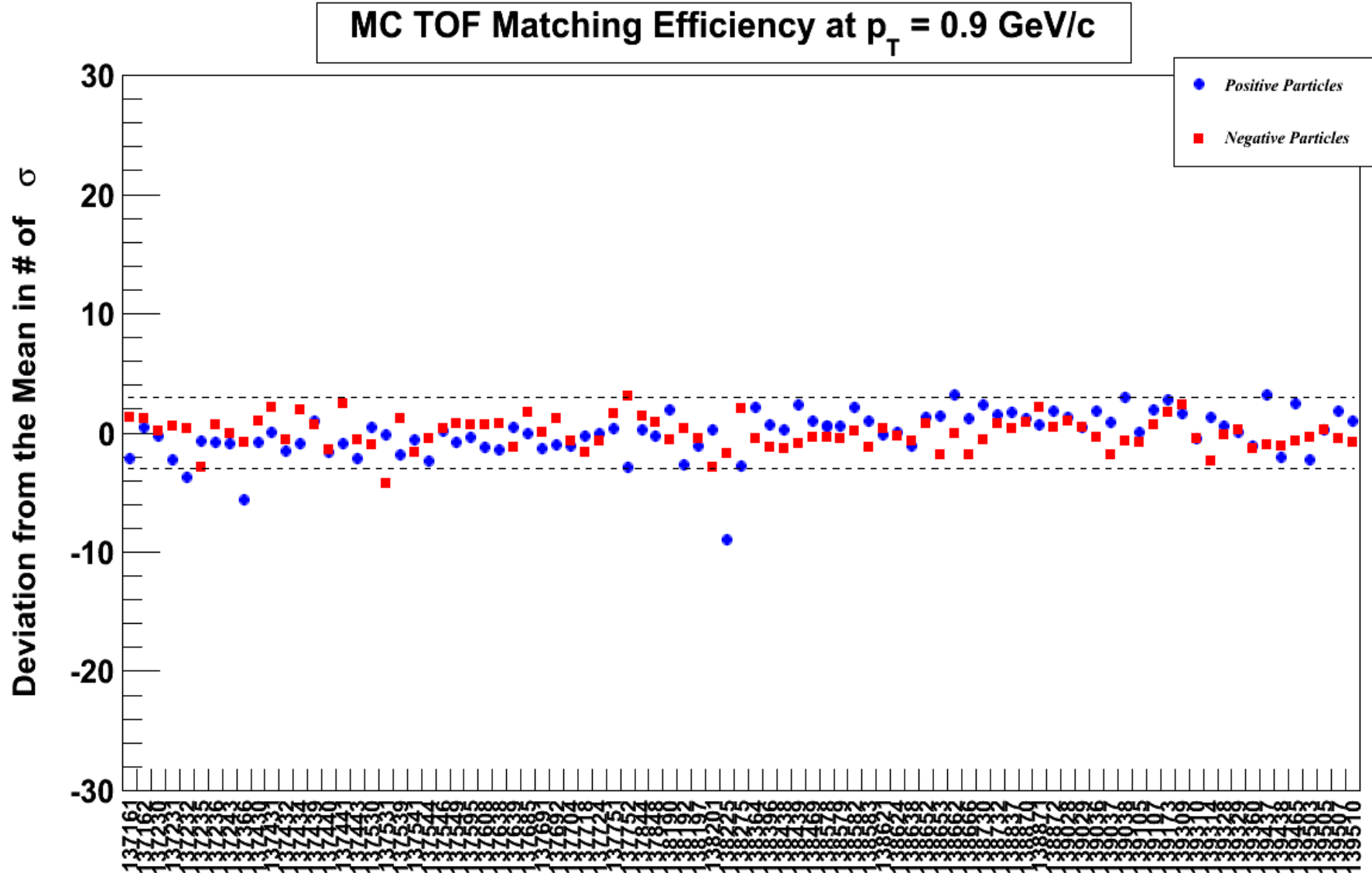
Questions?

Backup Slides

A check with no major outliers:



Outliers not reproduced in Monte Carlo...



Efficiency Corrections:

- Monte Carlo Correction
 - Accounts for losses in detector material, secondaries produced, etc
 - Will be modified by me soon
- MC-independent Efficiency Correction
 - To be added by me soon
- Geant/Fluka Correction
 - Known problem with Geant3
 - Not a problem with Fluka
- TOF Matching Efficiency Correction
 - Some particles do not reach the TOF