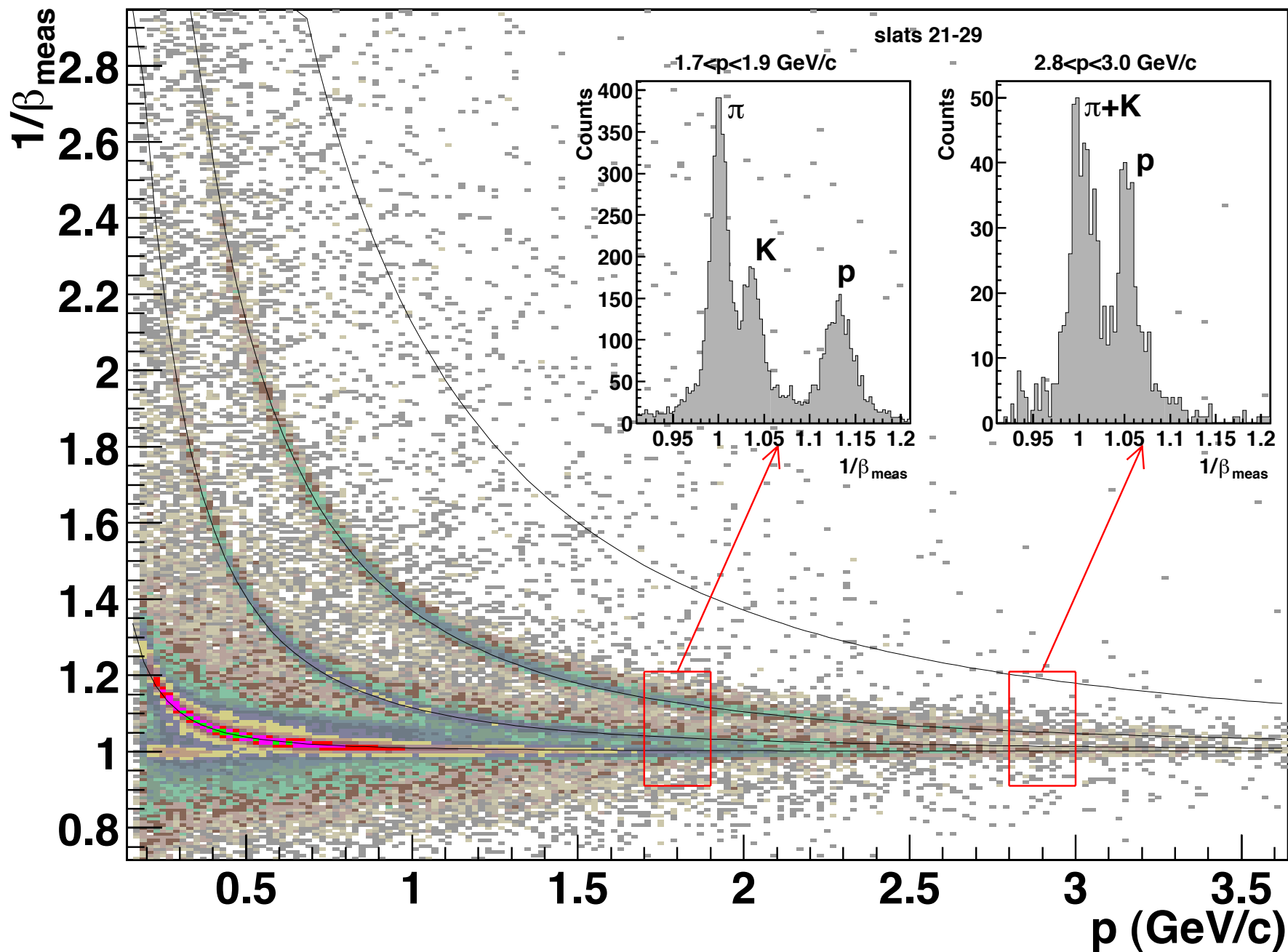




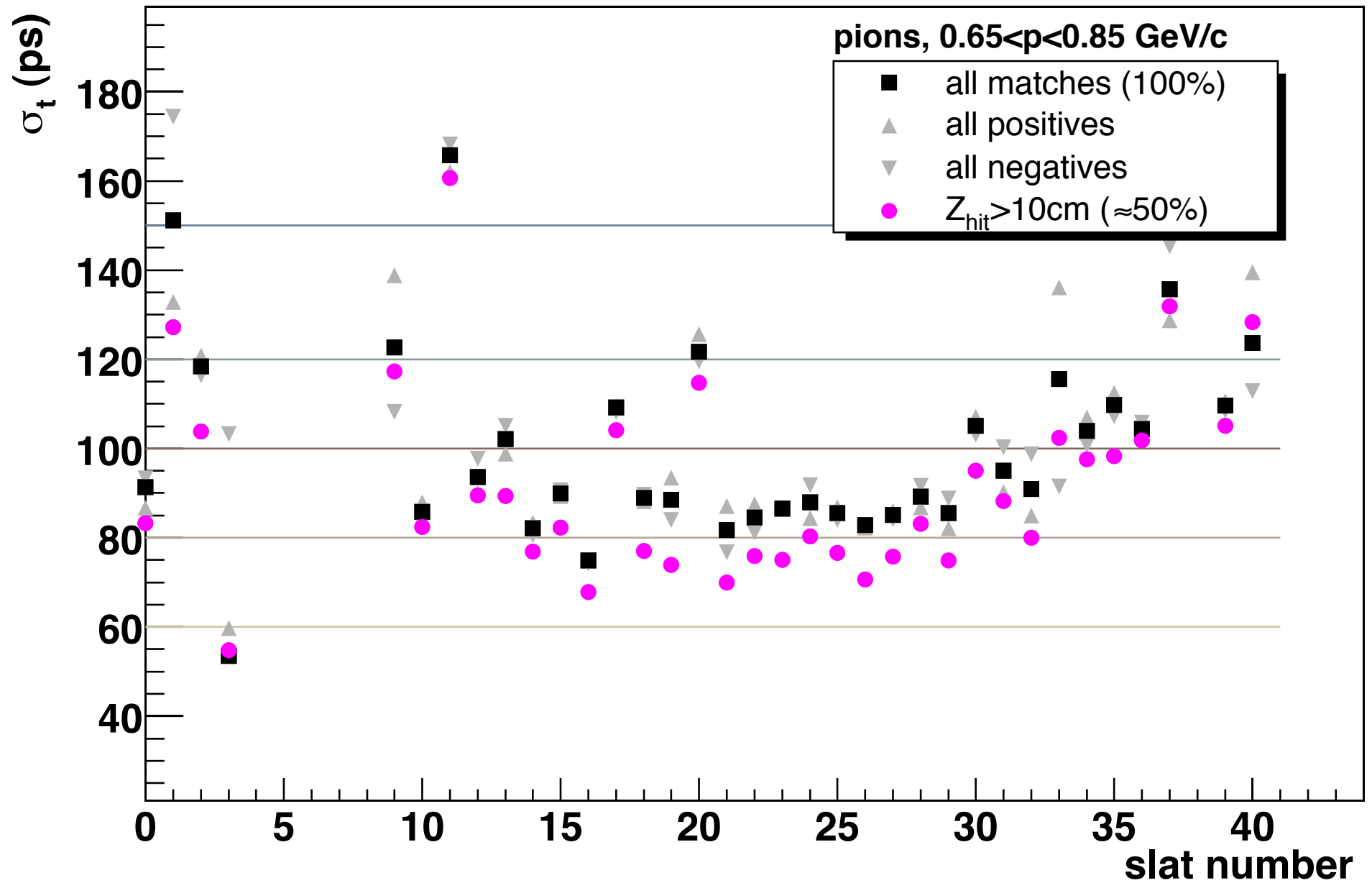
Overview of the STAR Time-Of-Flight Patch Project (TOFp/pVPD)

*W.J. Llope for the STAR TOFp Group
TOF meeting
USTC, China
October 17, 2004*

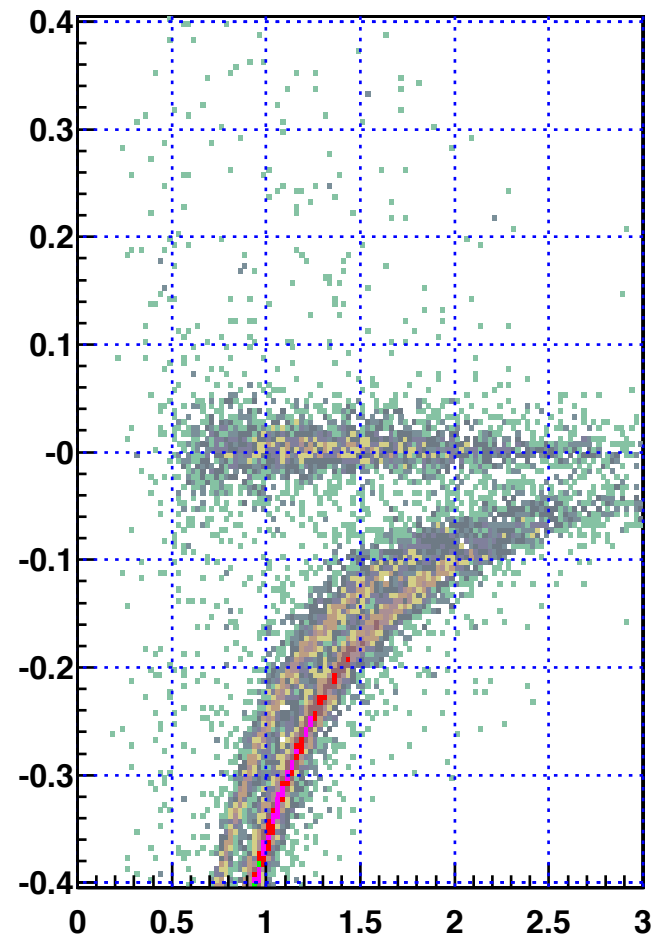
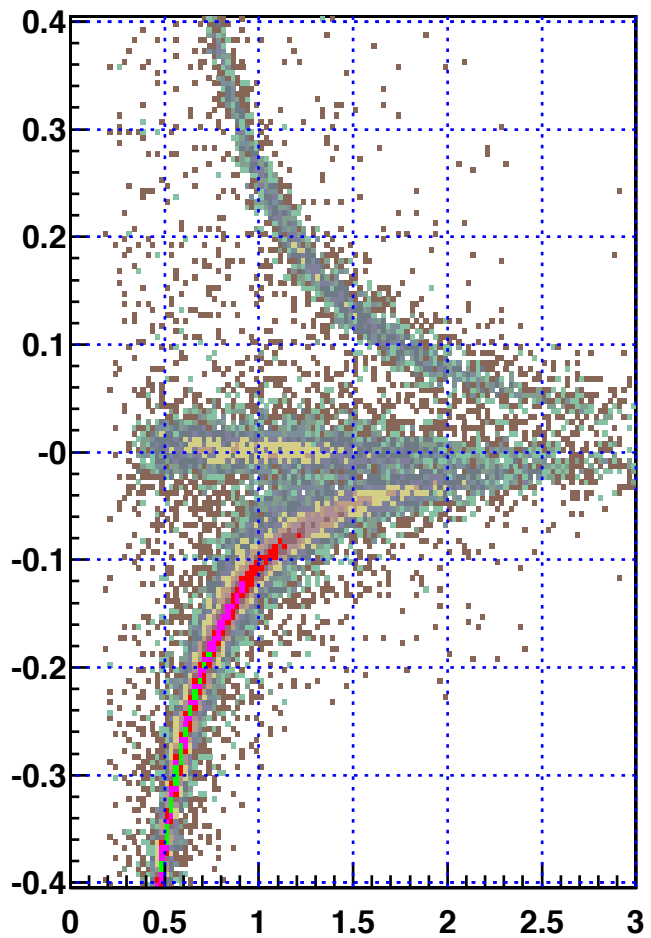
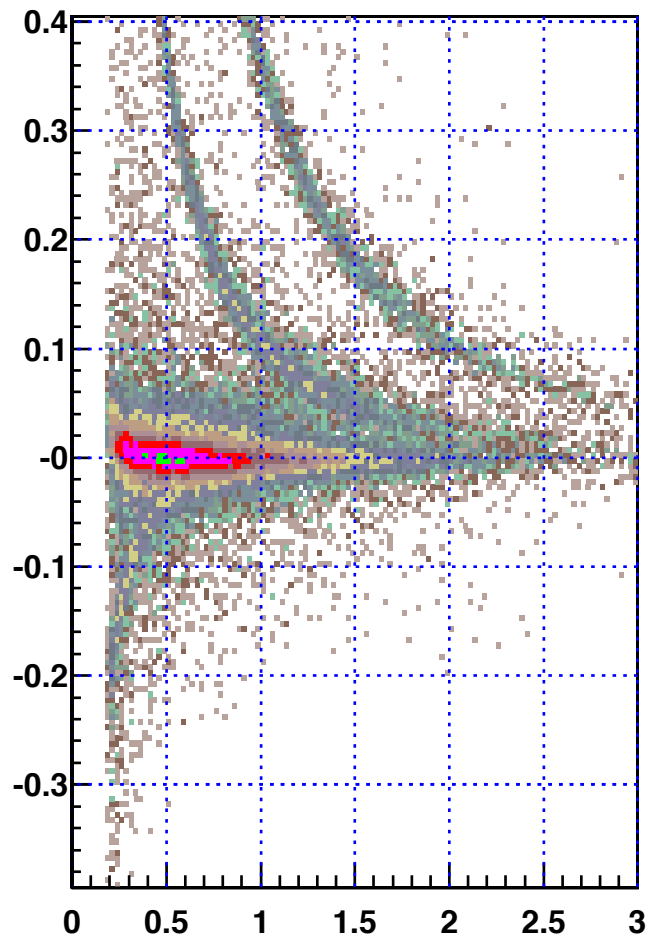
pVPD + TOFp performance in Run-2 (Au+Au)



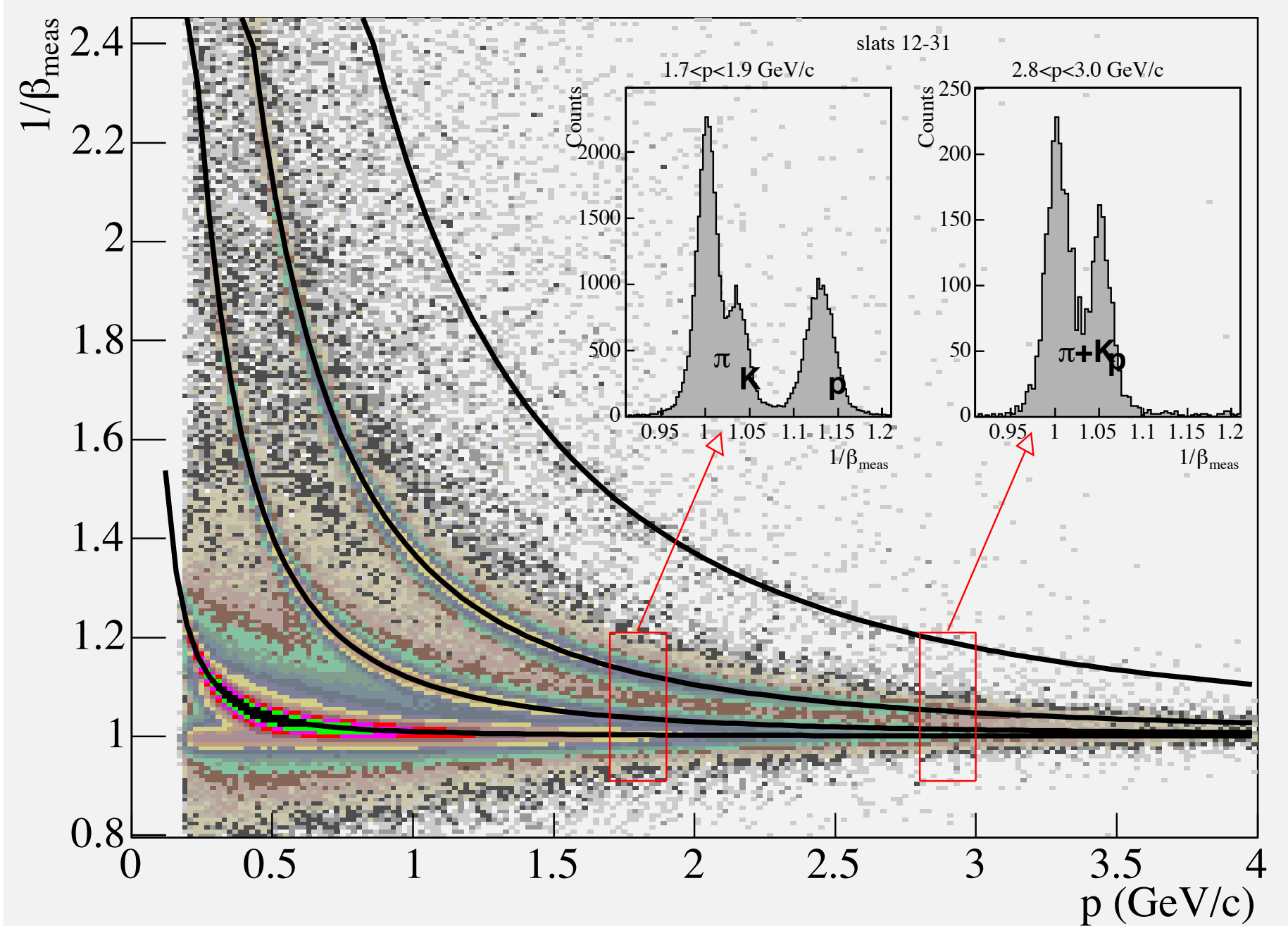
pVPD + TOFp performance in Run-2 (Au+Au)



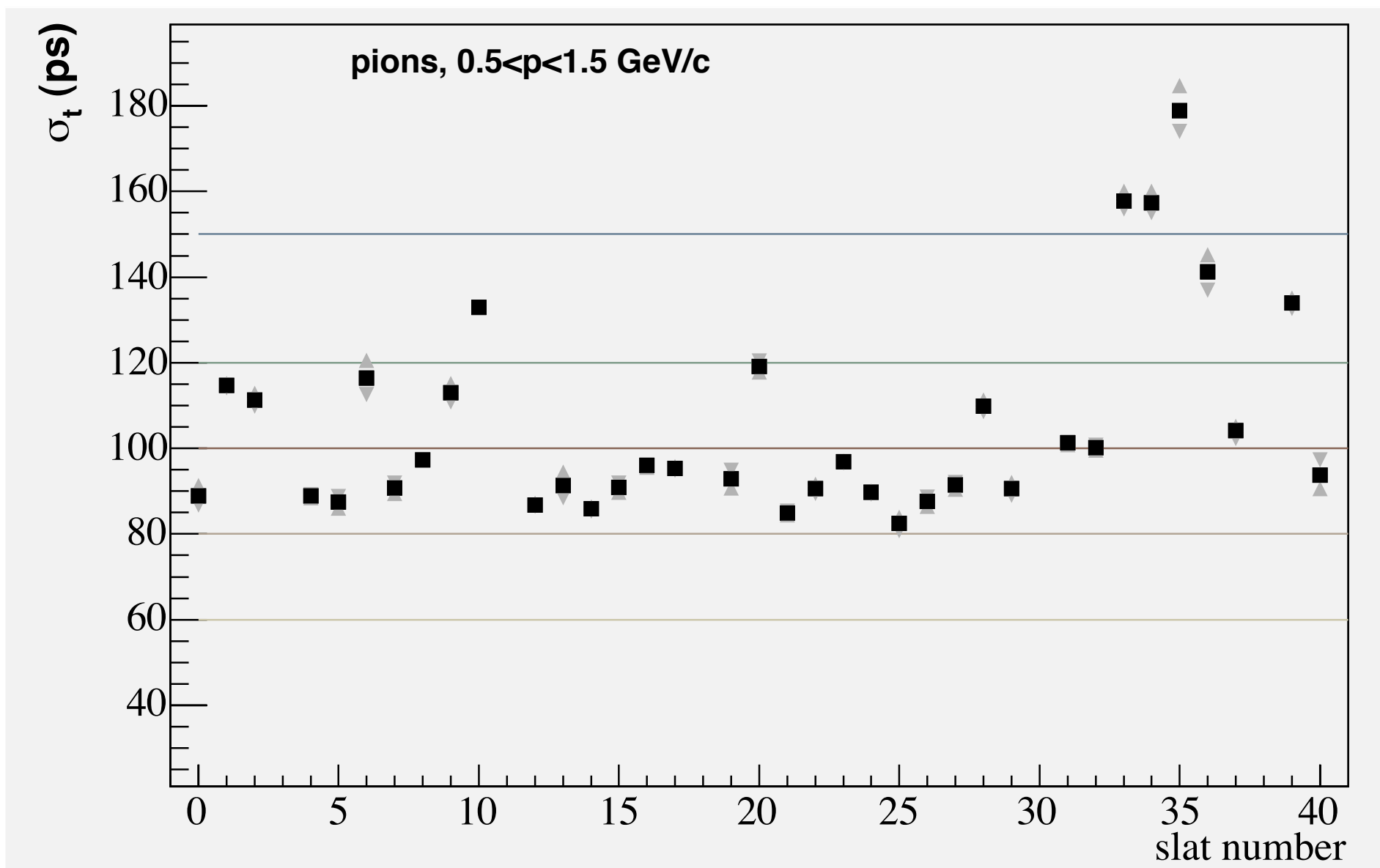
pVPD + TOFp performance in Run-3 (d+Au)



pVPD + TOFp performance in Run-4 (Au+Au)



pVPD + TOFp performance in Run-4 (Au+Au)





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The TOFp/pVPD time-of-flight system for STAR

W.J. Llope^{a,*}, F. Geurts^a, J.W. Mitchell^b, Z. Liu^c, N. Adams^a, G. Eppley^a,
D. Keane^e, J. Li^d, F. Liu^c, L. Liu^c, G.S. Mutchler^a, T. Nussbaum^a, B. Bonner^a,
P. Sappenfield^a, B. Zhang^d, W.-M. Zhang^e

^a *T.W. Bonner Nuclear Laboratory, MS 315, 6100 S. Main Street, Rice University, Houston, TX 77005-1892, USA*

^b *NASA-Goddard Space Flight Center, Code 661, Greenbelt, MD 20771, USA*

^c *HuaZhong Normal University, Wuhan, China*

^d *Institute of High Energy Physics, Beijing, China*

^e *Kent State University, Kent, OH 44242, USA*

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Abstract

A time-of-flight system was constructed for the STAR Experiment for the direct identification of hadrons produced in $^{197}\text{Au} + ^{197}\text{Au}$ collisions at RHIC. The system consists of two separate detector subsystems, one called the Pseudo Vertex Position Detector (pVPD, the “start” detector) and the other called the Time of Flight Patch (TOFp, the “stop” detector). Each detector is based on conventional scintillator/phototube technology and includes custom high-performance front-end electronics and a common CAMAC-based digitization and read-out. The design of the system and its performance during the 2001 RHIC run will be described. The start resolution attained by the pVPD was 24 ps, implying a pVPD single-detector resolution of 58 ps. The total time resolution of the system averaged over all detector channels was 87 ps, allowing direct $\pi/K/p$ discrimination for momenta up to $\sim 1.8 \text{ GeV}/c$, and direct $(\pi + K)/p$ discrimination up to $\sim 3 \text{ GeV}/c$.

TOFp Project (TOFp+pVPD) Summary:

- first TOF system installed in STAR: TOFp & pVPD proved that the TOF concept works in STAR...
TOFp+pVPD produced large, high-quality, data-sets in Runs 2, 3, & 4.
- provided real data starting run Run-2 that allowed the development of TOF offline software many years in advance of the existence of the full system...
TOFp matching algorithms adopted and used, as is, by subsequent TOFrX systems...
(only differences are in the geometry implementation)
Now, TOF is deeply embedded in STAR Offline software, again years in advance of the full-system (*i.e.* years ahead of any other system in STAR w.r.t. their hardware)...
- provides high-quality PID for physics analyses of the Run-2, -3, & -4 data in the Spectra, Heavy Flavor, & High-Pt PWGs...
- allowed very rapid commissioning of the first full-prototype TOFr tray in STAR in Run-3.
TOFr and TOFr' were in fact sub-systems of the TOFp System....
MRPC data in Runs-3 and 4 would not have been possible without the TOFp system being there.
the results from TOFr via TOFp were appreciated during the various BNL DAC reviews which helped keep R&D \$\$ flowing and the proposal for the full system on track...
- collected the data leading to the first physics result ever obtained from MRPCs in an experiment...

Many thanks to HauZhong/Wuhan (LIU Feng, LIU Lianshou, LIU Zhixu)
and IHEP/Beijing (LI Jin, ZHANG Bingyun)
for their important contributions of PMTs, DAQ hardware, & DAQ software!!!!!!

The TOFp Project would not have been possible without these important contributions!

