

Hadron Spectra Analysis with PHENIX

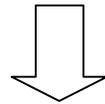
- Current status and plan -

1. **Expected Day-1 statistics**
2. **Current status**
 - i. **Reconstruction efficiency and momentum resolution**
 - ii. **TOF calibration**
 - iii. **PID**
3. **Strategy for Day-1 hadron physics**

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Expected Day-1 Statistics

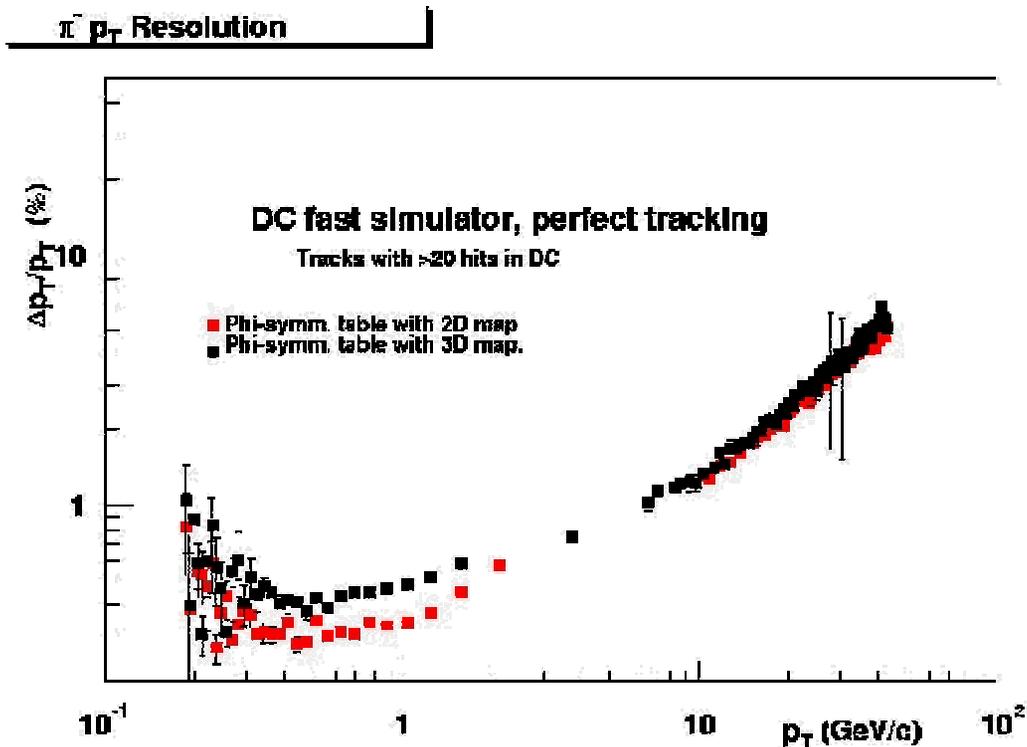
- $20 \mu\text{b}^{-1}$ (integrated) corresponds to 120M Au-Au minimum bias events @10% luminosity (*from Beam Use Proposal '99*)
- Reality is ... **1% of design luminosity in Day-1**



12 M minimum bias events
1.2 M central events

- ☆ **Minimum bias: π^+ (40M), K^+ (1.5M), proton (2M), pbar (1.5M)**
- Particle ratio
 - p_t distribution
 - HBT ($\pi\pi$)

p_t resolution



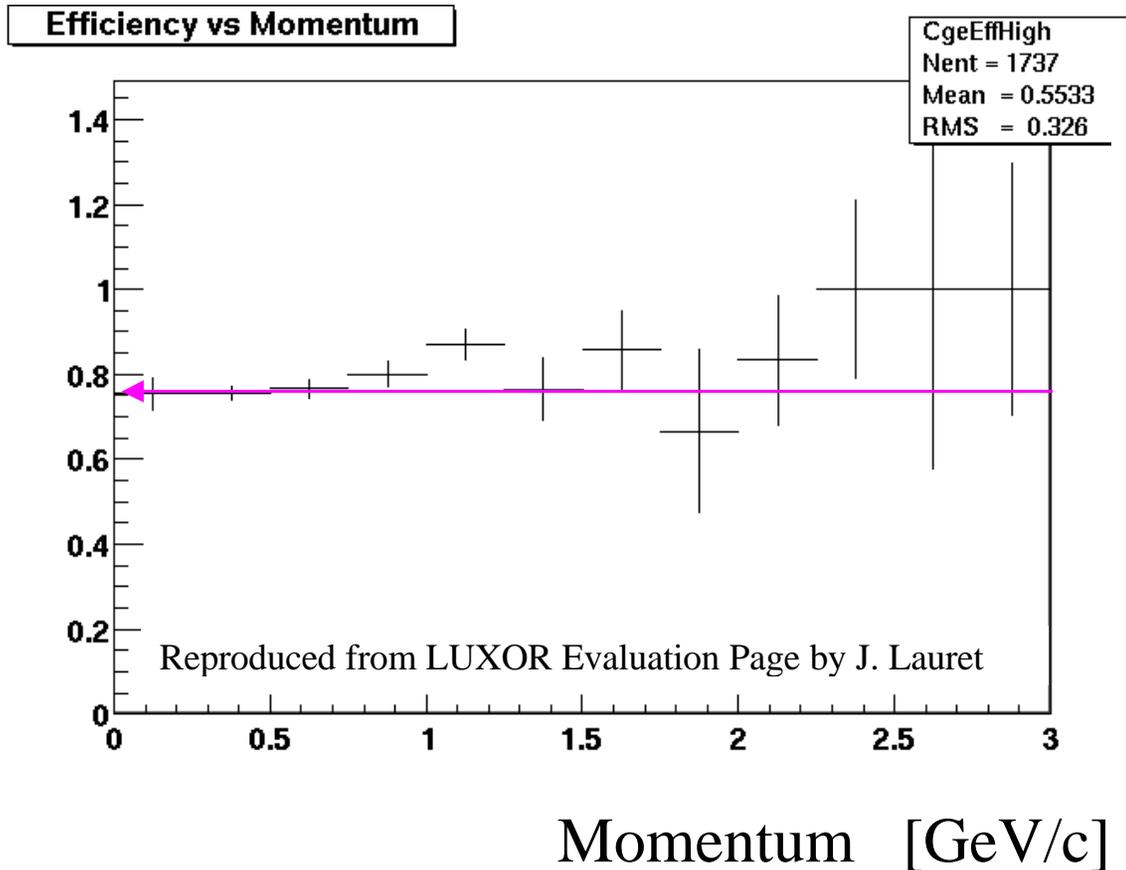
Reproduced from 4/17/00 J. Lajoie @ Comp. Meeting

- * Particle: π^-
- * Tracks with > 20 hits in DC
- * Using a phi-symmetric reconstruction with the PISA 3D field map

$$\underline{\Delta p_t/p_t < 1\% (p_t < 5 \text{ GeV/c})}$$

Good enough momentum resolution at low- p_t region

Track reconstruction efficiency



**GEANT base
Evaluation package
“Cge”**

* Output Histograms
DC-PC1,2,3 matching eff.
Overall reconstruction eff.
(as a function momentum)

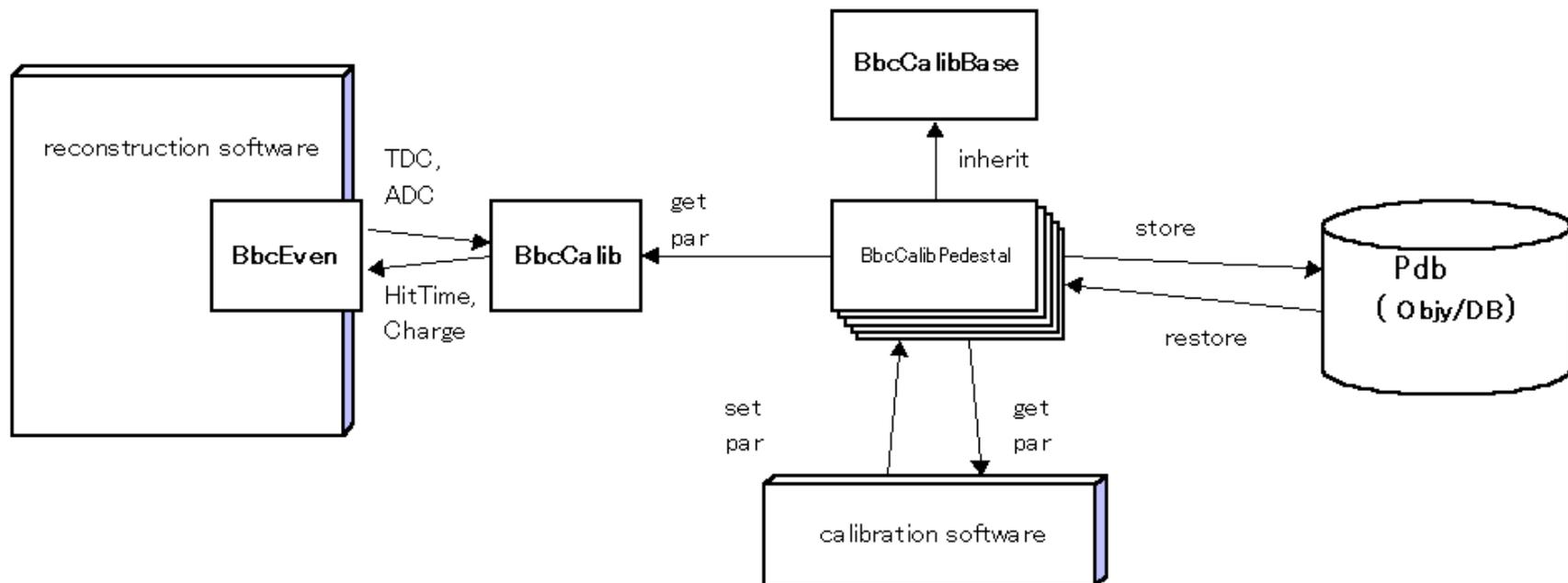
**Now... ~ 80% efficiency
(Hijing Central 100evt.)**

- * But it is still under development
- * No multiplicity dependence study

TOF Offline/Calibration Framework

How BBC offline code works

Simple framework
Easy to modify for TOF



- * Start from scratch!
- * Same structure as BBC/ZDC
- * Use Address and Geometry Object for database access (written by A. Kiyomichi)
- * Use Calibration Base class (1st version in CVS written by H. Ohnishi)
- * Writing TofEvent, TofCalib code (by T.Chujo)

Particle Identification

1st TOF-PID task force meeting (4/7/00)

- * PID base class, proposed by H. Ohnishi

Starting point: DST

$$L, p, TOF \implies M^2 \iff \text{Measured } \sigma_M^2$$

Calculate probability for each track (e.g., π 90%, K 10%)

- * Conventional way of PID

Set criteria for PID and count number of particles

- “Good” track selection (vertex cut, χ^2 , etc...)
- TOF association
- Energy loss on TOF
- low/high momentum cutoff

Strategy for Day-1 Hadron Physics

- TOF offline/calibration coding (next core week)
- Statistics study for TOF calibration (M. Suzuki)
- Multiplicity dependence of track reconstruction efficiency
- Acceptance & decay corrections (A. Kiyomichi)
- PID Base class developments

Jeff's comment @ Apr.12 Computing meeting....

TOF: Lots of work is now underway that hasn't yet reached the repository. Expect a multitude of updates here soon. The manpower situation is excellent.