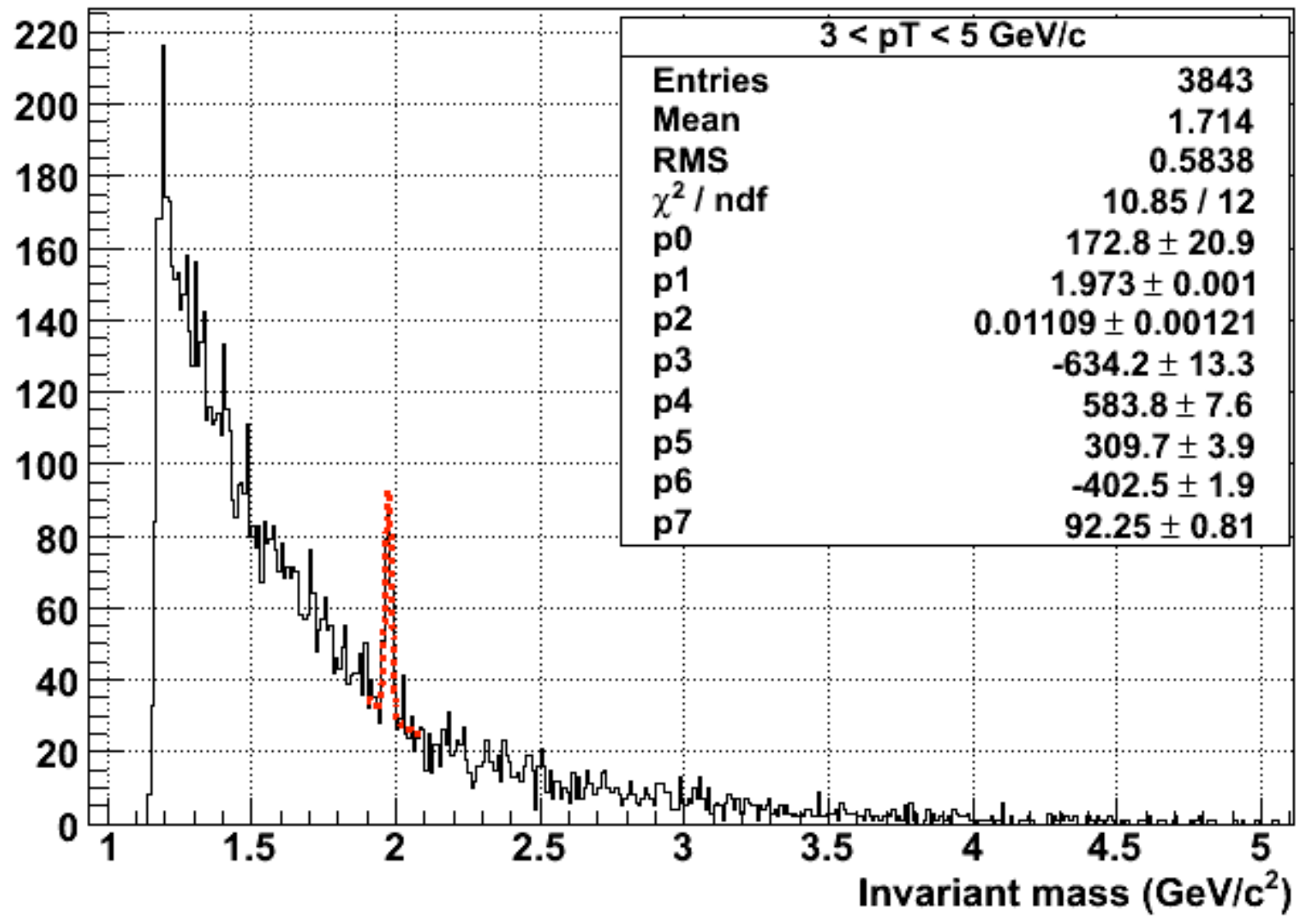# Software status/plans

S. Margetis

BNL – March 10, 2009

Status

- **We have completed CD1/CDR work**

  - **We have clarified a set of questions about**
    - **PIXEL thickness impact on Physics (but still in progress)**
      - Run time
      - Errors on critical measurements (v_2 and R_{AA})
    - **Failure scenarios for IST, SSD**
    - **Optimization of IST, SSD positions**

- **We have expanded and refined physics capabilities**
  - **D^0, L_c results refined (better background, UPGR15 etc), plots updated**
  - **Work of optimizing cuts in lower pt region begun**
  - **B-meson reconstruction greatly improved/clarified**
 - **Work on the D_s and D^+ in progress**

  All these updates were included in the submitted CDR

Ds

Invmass vs Pt

3 < pT < 5 GeV/c	
Entries	3843
Mean	1.714
RMS	0.5838
χ^2 / ndf	10.85 / 12
p0	172.8 ± 20.9
p1	1.973 ± 0.001
p2	0.01109 ± 0.00121
p3	-634.2 ± 13.3
p4	583.8 ± 7.6
p5	309.7 ± 3.9
p6	-402.5 ± 1.9
p7	92.25 ± 0.81

Invariant mass (GeV/c^2)

D_s reconstruction simulation

- $D_s \rightarrow K^+K^-\pi$ (BR 5.5%)
- $D_s \rightarrow \varphi\pi \rightarrow K^+K^-\pi$ (BR 2.2%)
- **mass** = 1968.49 ± 0.34 MeV
- **decay length** ~ 150 *um*

- Work in progress …
- Central Au+Au collisions at 200 GeV
- Ideal PID. Will include TOF later
- Total charm X-section from PHENIX
- Assume a power-law spectrum with $n = 11$, $<p_T> = 1$ GeV/c
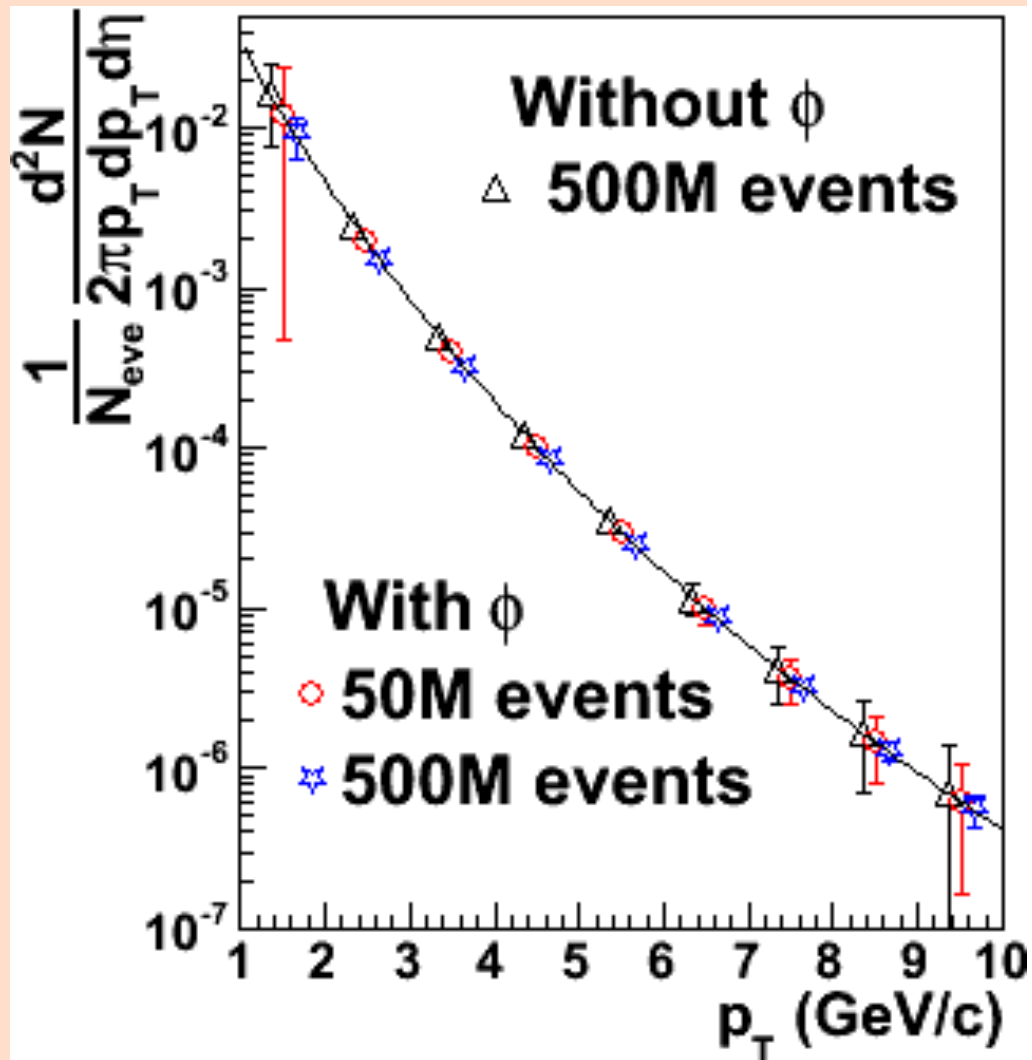
Status-II

- **We have completed two more productions for thin/ thick PIXELS**

    - To enhance statistics in critical areas
    - For CD1 homework
        - Results come in daily

- **We have made huge progress in secondary vertex fitting**

    - NOT a result of HFT work per se
    - Track info inside vacuum (important)
    - Full error fitting out/in Kalman framework
    - STAR uDSTs already contain this info
    - This is a post-CDx area for effort

Plans

- ## First things first, pre-CD2 homework asap
  - Finish analyses on current + cdr productions, get plots
  - Write up the response

- ## PIXEL Calibration structures (see next slides)
  - Analysis of PIXEL data
  - Finalize and implement methods and structures
  - Need 3-4 day workshop with experts
    - LBL around the 2nd half of May?

- ## Expand on simulation work
  - Finalize Ds, D+

- Create/Populate 'official' areas

The research milestones are based on the following project milestones:

Q4 FY 09	CD-1
Q4 FY 10	CD-2/3
Q4 FY11	New STAR beam pipe installed (off- project funding)
Q4 FY 11	Engineering prototype installed
Q4 FY 12	Pixel detector installed
Q4 FY 13	HFT fully installed
Q2 FY 14	CD-4

FY2009 Milestones

Q3 FY 09	Complete simulations for CD0 homework
Q4 FY 09	Complete CD1 simulations
Q4 FY 09	Concept for spatial calibration of Pixel
Q4 FY 09	IST detector response simulator implemented

FY2010 Milestones

Q2 FY 10	Concept for HFT Calibration
Q2 FY 10	IST pre-prototype module cosmic ray test, calibrated and analyzed
Q2 FY 10	Pad Monitor functioning
Q2 FY 10	Calibrate Pixel prototype
Q4 FY 10	Cosmic ray test of engineering prototype done and analyzed
Q4 FY 10	Update geometry in simulations

Needs update/streamlining

FY2011 Milestones

Q1 FY 11	Functional Pixel Calibration
Q3 FY 11	Cosmic ray test for Pixel prototype and SSD performed and analyzed
Q4 FY 11	Tracker/Vertex finders upgraded/tuned/ debugged
Q4 FY 11	IST prototype module cosmic ray test
Q4 FY 11	Calibration Databases finalized

FY2012 Milestones

Q1 FY 12	Pixel prototype calibrated
Q1 FY 12	Cosmic ray test of fully integrated IST barrel analyzed
Q3 FY 12	Reconstruction software finalized/ready for physics
Q3 FY 12	Finalize geometry in simulations
Q3 FY 12	Functional HFT calibration
Q4 FY 12	Analyze data from prototype run