



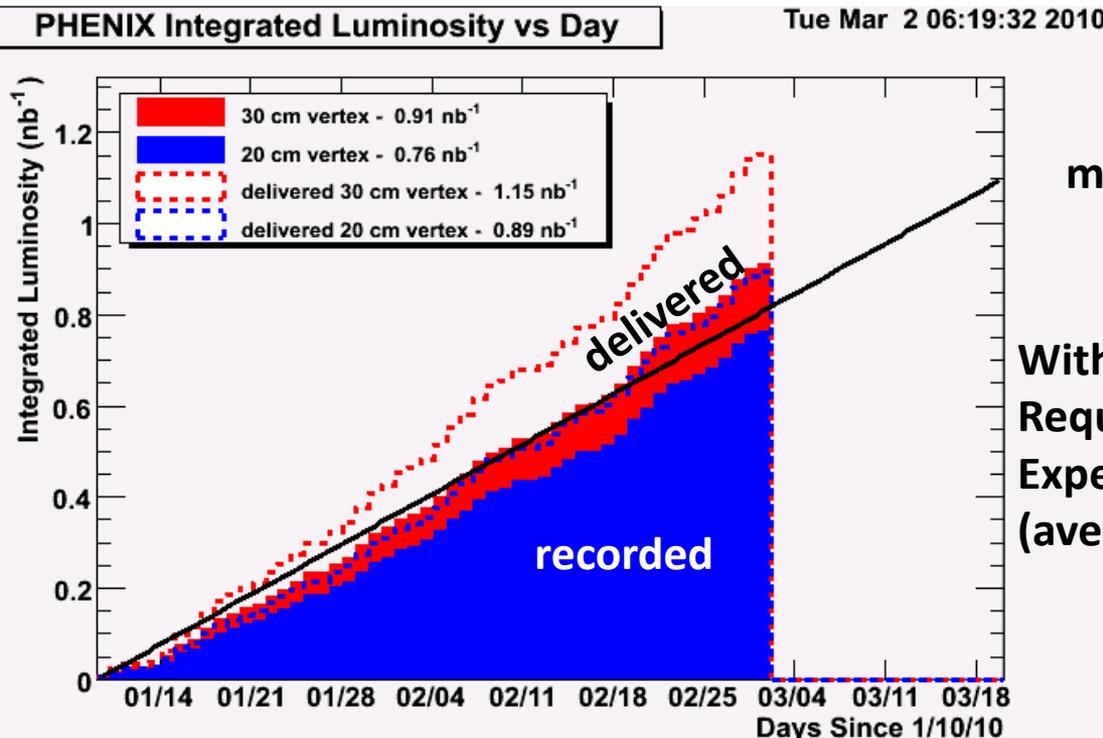
# The 10-Week 200 GeV Run for the HBD

Stefan Bathe

RHIC Machine-Experiment Meeting  
3/2/2010

# Integrated Luminosity: Accumulated

Overall recorded/delivered:  
 $0.9 \text{ nb}^{-1}/3.2 \text{ nb}^{-1} = 0.28$   
 (preliminary!)



minimum goal

Within  $\pm 30$  cm:

Requested in Beam Use Proposal:  $1.4 \text{ nb}^{-1}$   
 Expectation before Run start :  $1.1 \text{ nb}^{-1}$   
 (average machine projections)

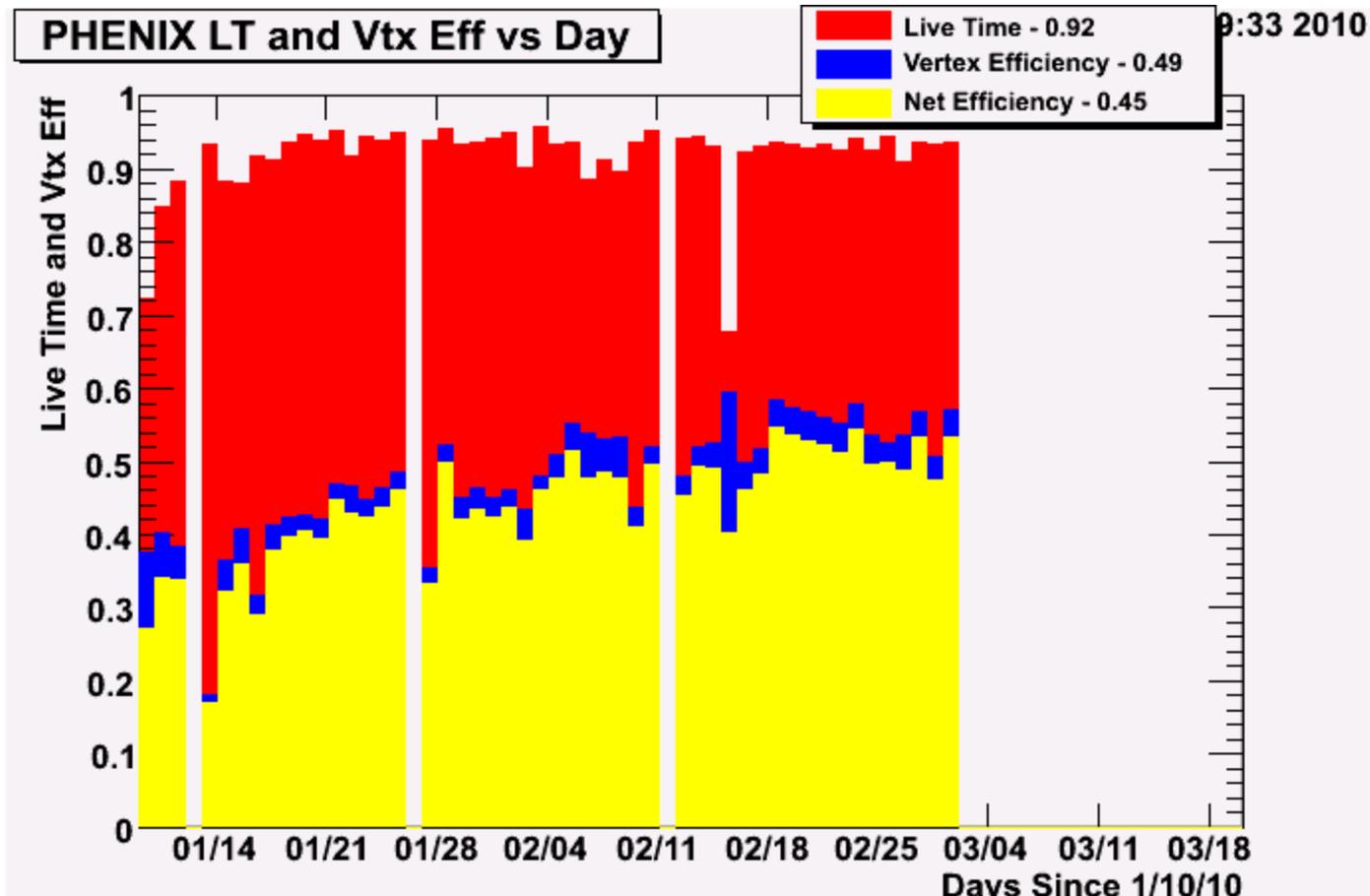
March 2

March 20

Recorded so far within  $\pm 30$  cm:  $0.9 \text{ nb}^{-1}$   
 Recorded so far within  $\pm 20$  cm:  $0.77 \text{ nb}^{-1}$

projection:  $1.25 \pm 0.1 \text{ nb}^{-1}$   
 projection:  $1.1 \pm 0.1 \text{ nb}^{-1}$

# Vtx Cut and DAQ efficiency



Fraction of all events recorded within 20cm = 0.86 (when PHENIX on)

Fraction of all events recorded within 30cm = 0.79 (when PHENIX on)

# PHENIX Uptime

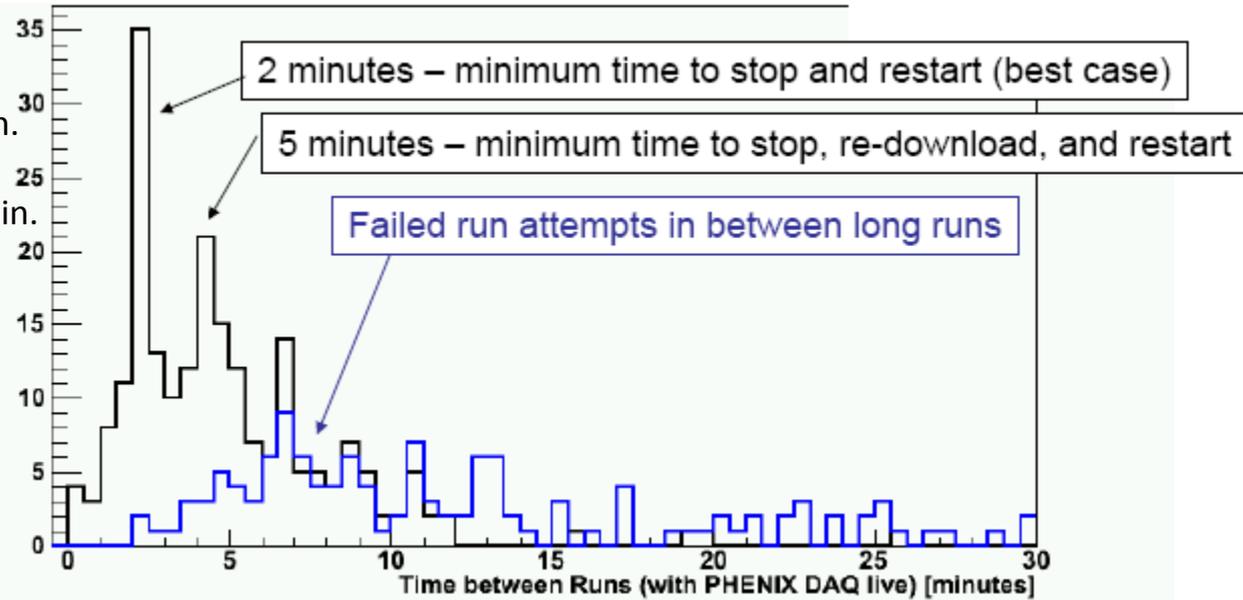
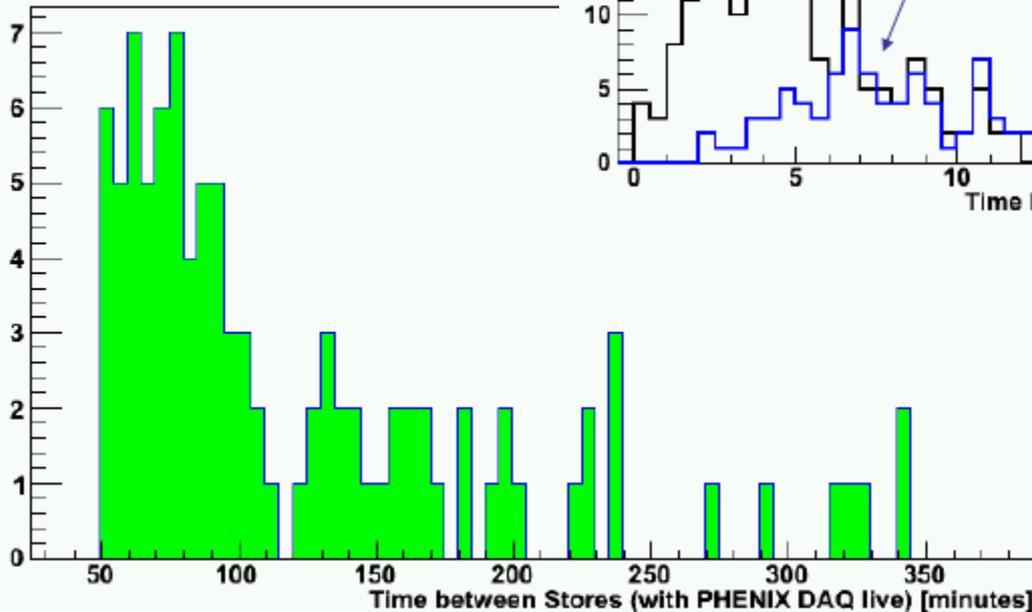
Time between runs (same store)

(1) no problem:

216 entries: mean = 5.2 min., RMS = 5.0 min.

(2) problem:

147 entries: mean = 13.7 min., RMS = 9.4 min.

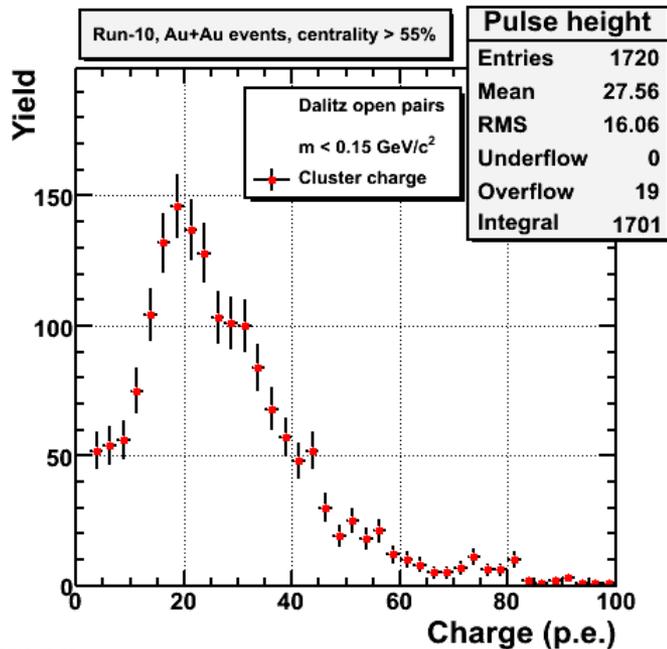


Time between end of last run of a store, and start of first run for the next store:

Minimum time is 50 minutes.

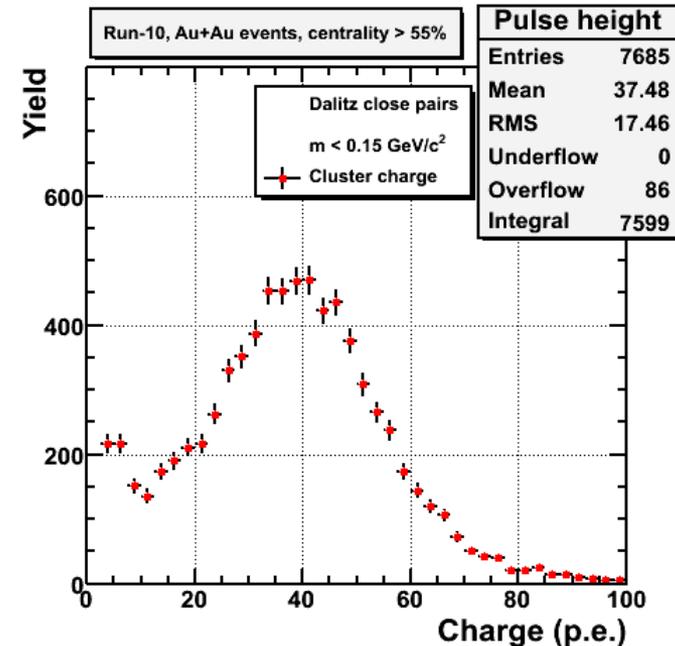
Note after we end of last run of a store, MCR has to dump beam, re-inject, cog, steer, collimate, then our HV is fully turned on and we start DAQ.

# HBD Performance I



2010-02-22

~ 20 photo electrons  
per single electron track  
(as in design specs)



2010-02-22

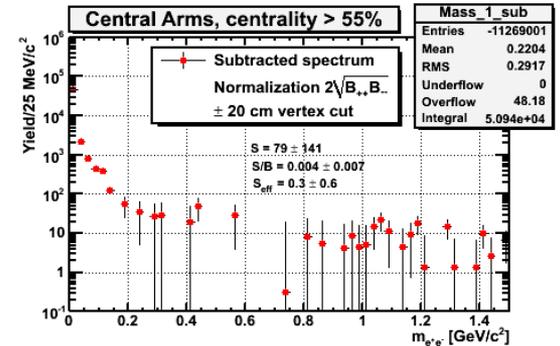
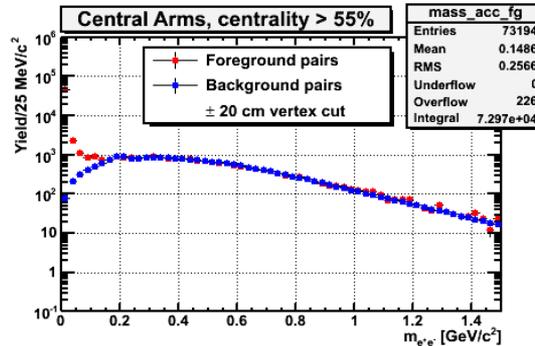
~ 40 photo electrons  
per double electron track

- HBD is performing well and data are indeed valuable
- HBD will deliver on its physics goals

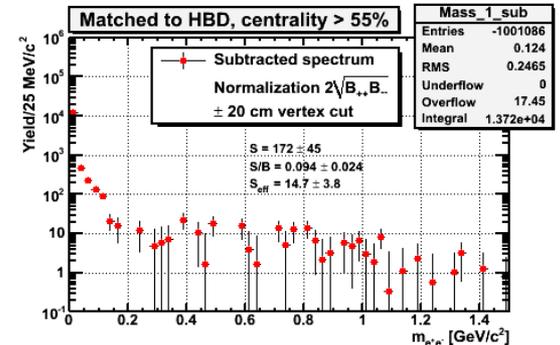
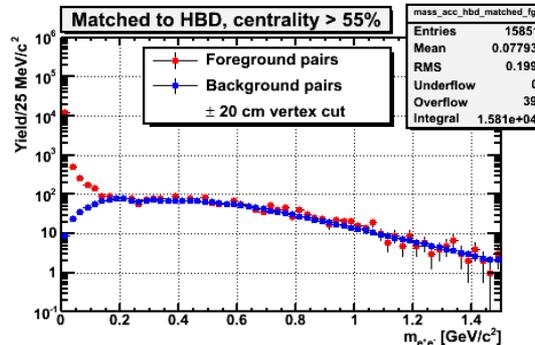
# Proof of Principle

- Mass spectra

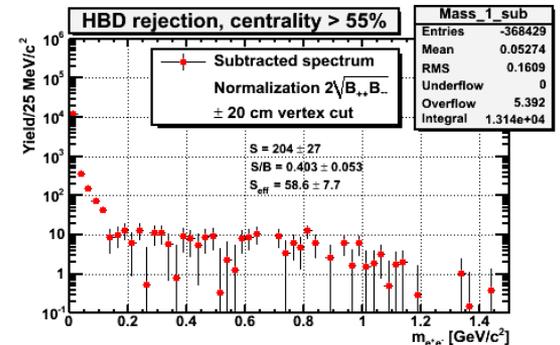
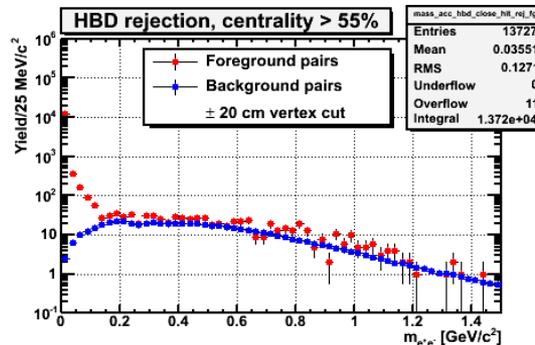
– no HBD



– with HBD matching



– with HBD rejection



From 120 M peripheral events

2010-02-23

# Run Plan

$\sqrt{s_{NN}}$ (GeV)	Physics production or beam studies weeks	
	25-cryoweek run	27-cryoweek run
200	10	10
62.4	4	4
39	1.5	1.5
27	0	0
18	0	0
11.5 @ STAR	0	2
7.7	4	4
Beam studies @ 5 GeV and @ $v \approx 0.67$	0.5	0.5

Run plan assumed:

physics weeks = cryo weeks - 3

Reality:

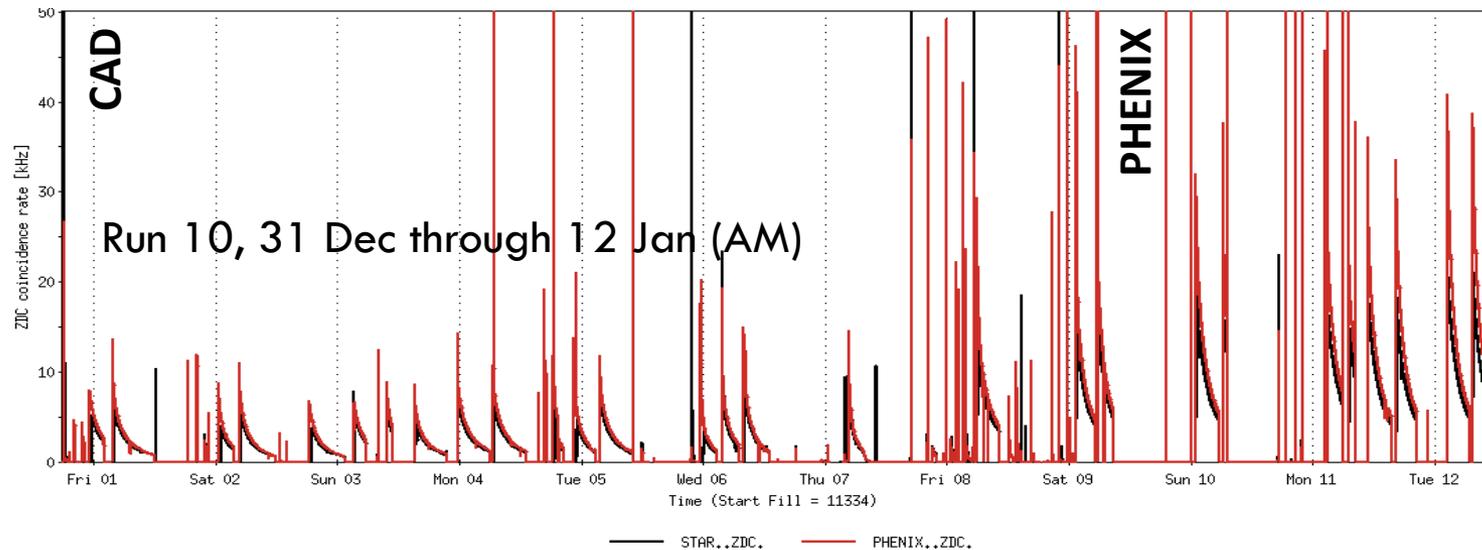
physics weeks = cryo weeks - 6



Current 28 cryo week scenario =  
run-plan 25 cryo week scenario  
in terms of physics weeks

Steve Vigdor's revised RHIC  
Run 10 Plan, 11/25/2009

# PHENIX Physics Run Started January 10



- CAD declared Physics only two days/six stores after first collisions
  - no realistic chance for experiment set-up
- Jan 1-10: only 1.5 stores per day; with extremely low luminosity
  - virtually no integrated luminosity accumulated
- Jan 21: first store with rebucketing on
  - physics criterion not met
- **PHENIX ready on Jan 10**
  - no HBD data earlier

# Summary

- Demonstrated that HBD will deliver on its physics goals
- HBD data taking began on January 10
- PAC placed 10 week 200 GeV HBD measurement as top priority
  - Impossible to revisit this measurement
- Only reason to revisit 100 % full-energy running would be failure of HBD—which is not the case

# **EXTRA SLIDES**

# PAC Recommendation

## Highest priority:

“**10 weeks of Au-Au collisions at  $\sqrt{s_{NN}} = 200$  GeV**, to exploit the PHENIX **Hadron Blind Detector (HBD)**. Since this is a **unique dataset for the HBD**, we consider it of **very high importance** that sufficient statistics be accumulated for a definitive measurement of the low mass vector channel spectral function in central 200 GeV Au-Au collisions.”

Recommendations, Brookhaven  
National Laboratory, Nuclear and  
Particle Physics Program Advisory  
Committee, June 15-16, 2009