PHENIX p+p running

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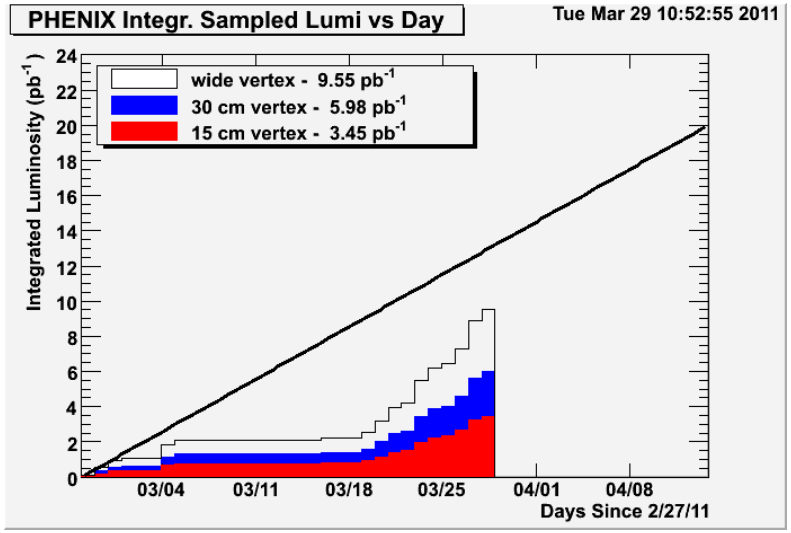
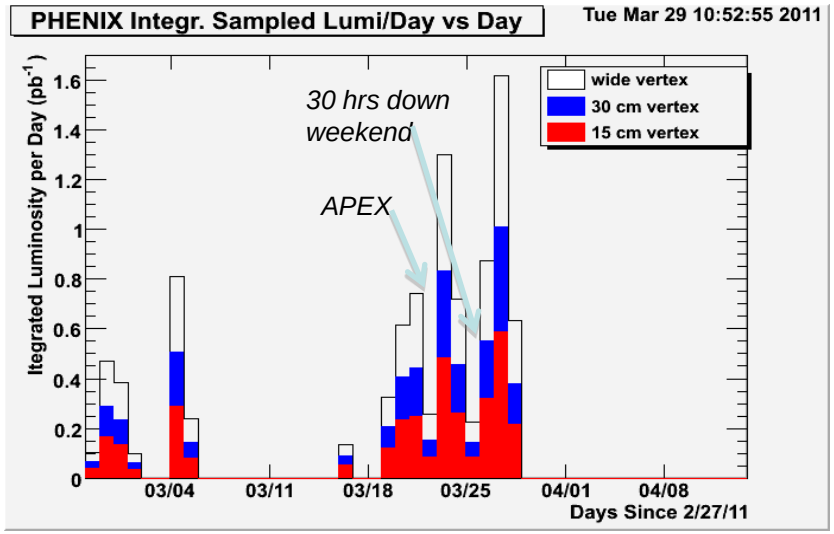
Overview

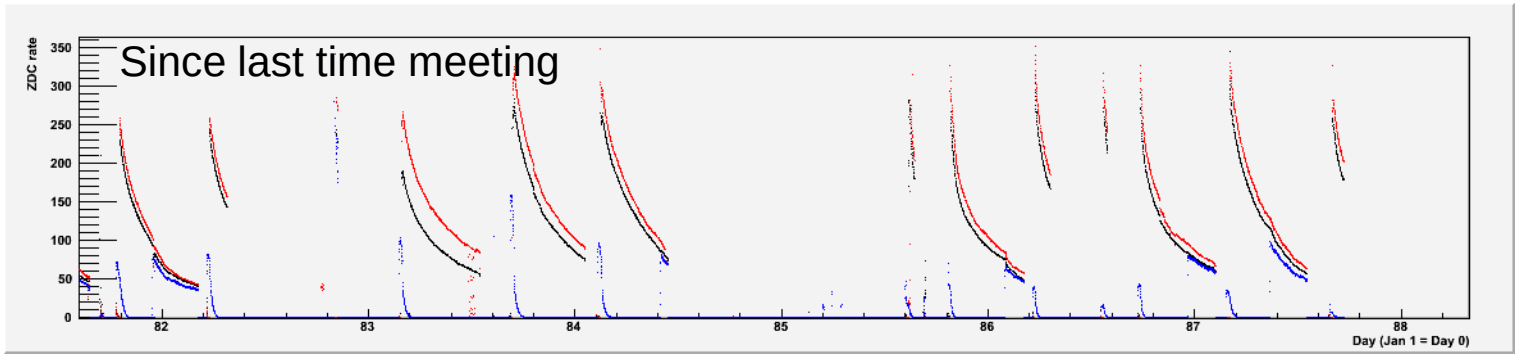
- Status
- Comments on AnDY impact on Luminosity
- What we can do with 20 pb^{-1} (p+p until 4/14).
  - W physics
  - A_{LL} in forward direction
  - VTX commisioning

Where we are

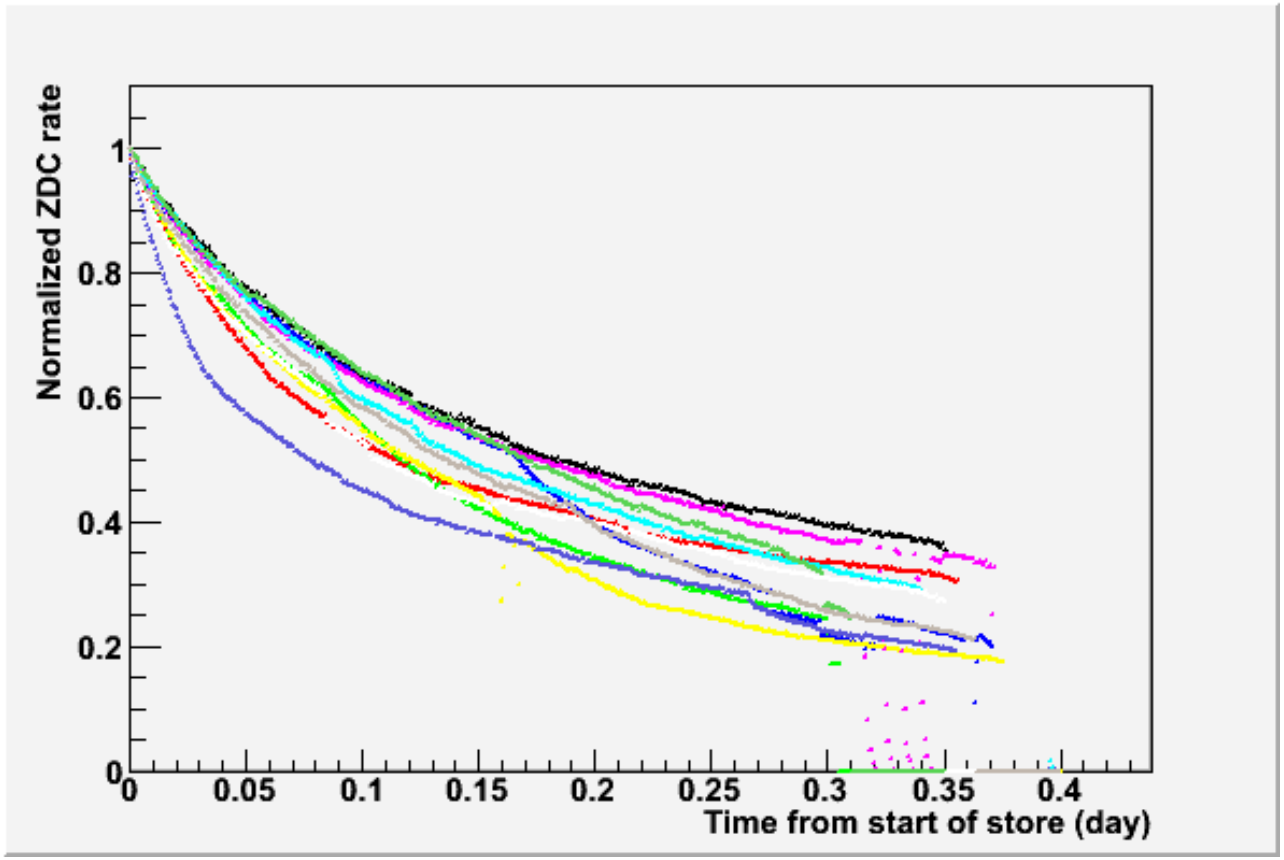




- Integrating Luminosity efficiently when beam
  - 1 pb^{-1} in +/- 30 cm yesterday!

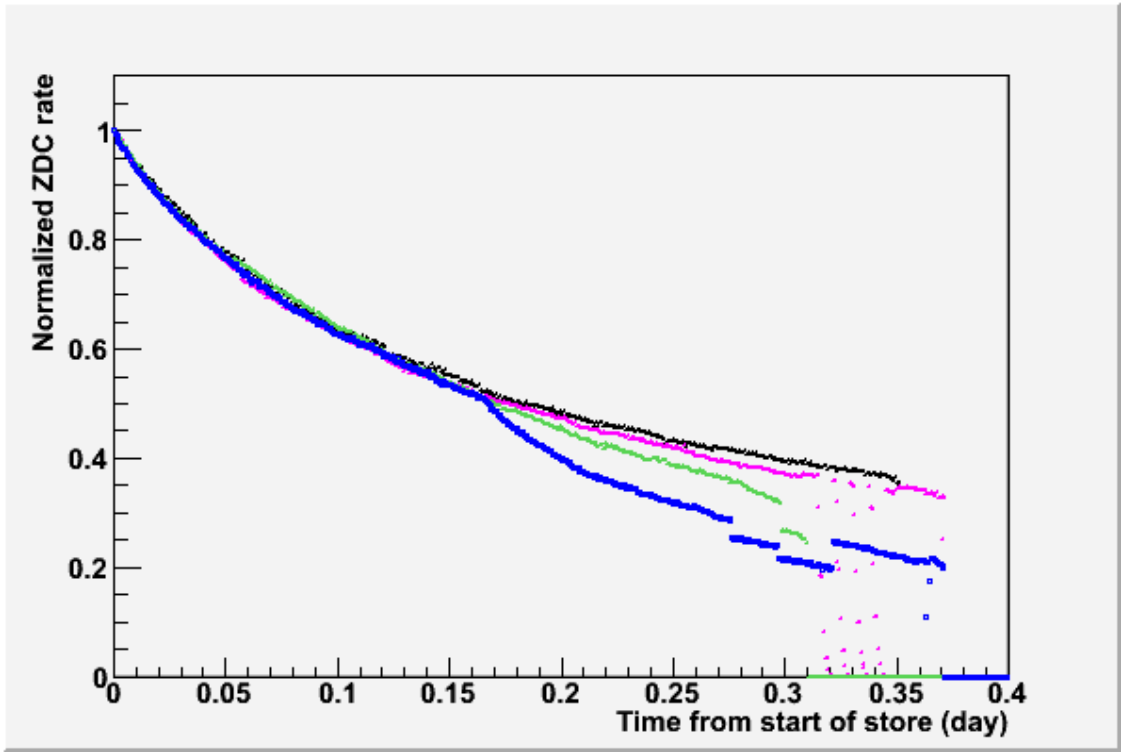


A Look at Lifetimes



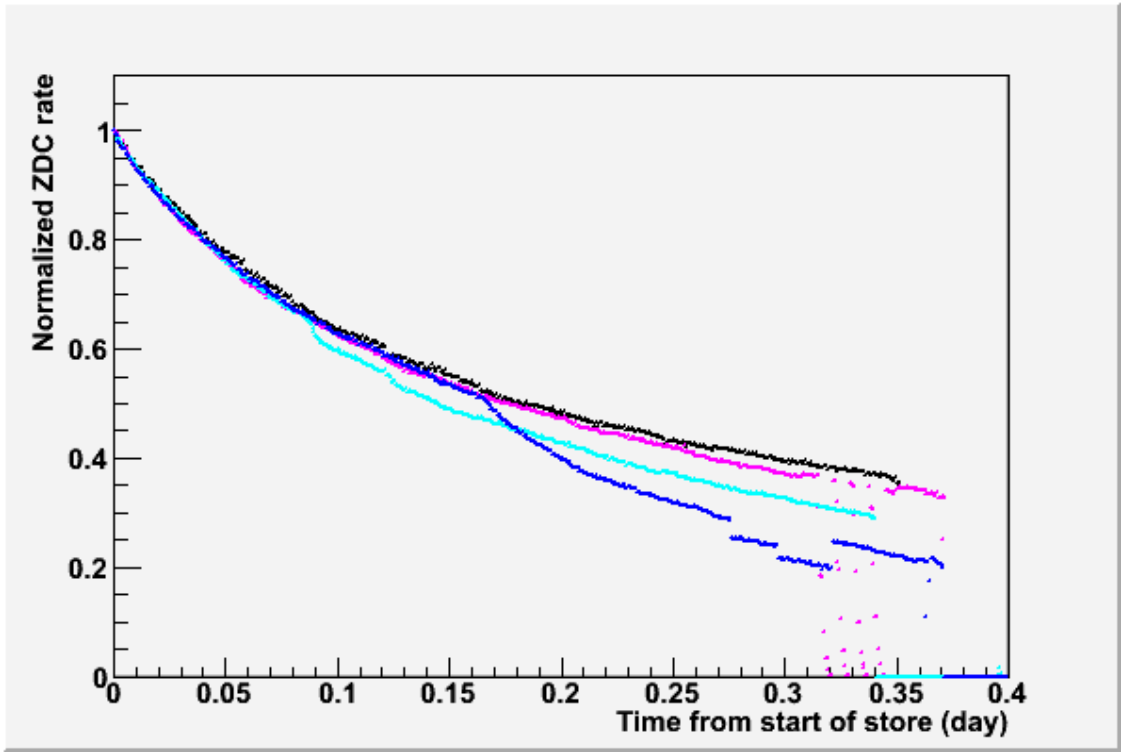
- Stores since Cryo Failure

Luminosity Impact of AnDY (I)



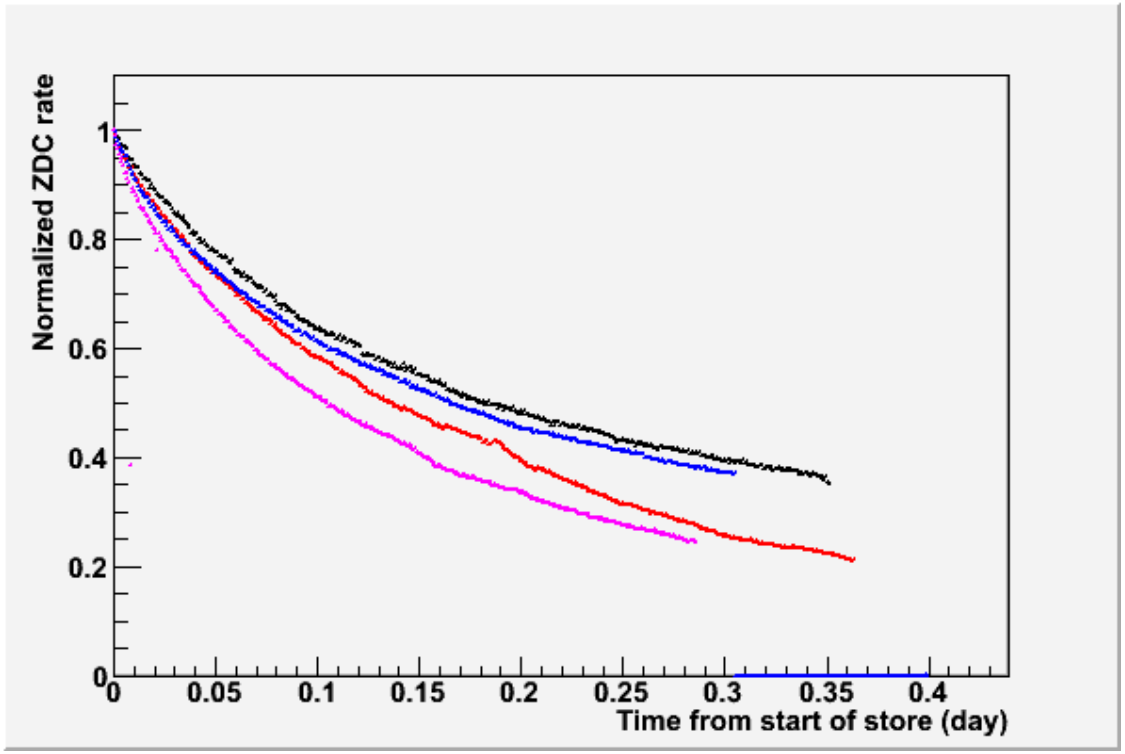
- Four fills with similar lifetimes
  - Blue fill had AnDY in collisions at clear kink
  - $\int_{\text{w/ AnDY}}(N^{ZDC}/N^{max})dt$ / $\int_{\text{w/o AnDY}}(N^{ZDC}/N^{max})dt = 0.88$
  - Visible luminosity impact in this fill; look at others…

Luminosity Impact of AnDY (II)



- Another fill with an impact
  - Light Blue fill had AnDY in collisions early
  - $\int_{\text{w/ AnDY}}(N^{ZDC}/N^{max})dt$ / $\int_{\text{w/o AnDY}}(N^{ZDC}/N^{max})dt = 0.90$

Luminosity Impact of AnDY (III)



- More recent fills
  - Yesterday (day), Yesterday (evening), Today morning
  - Still sometimes see impact
    - If like yesterday evening, then looks very good

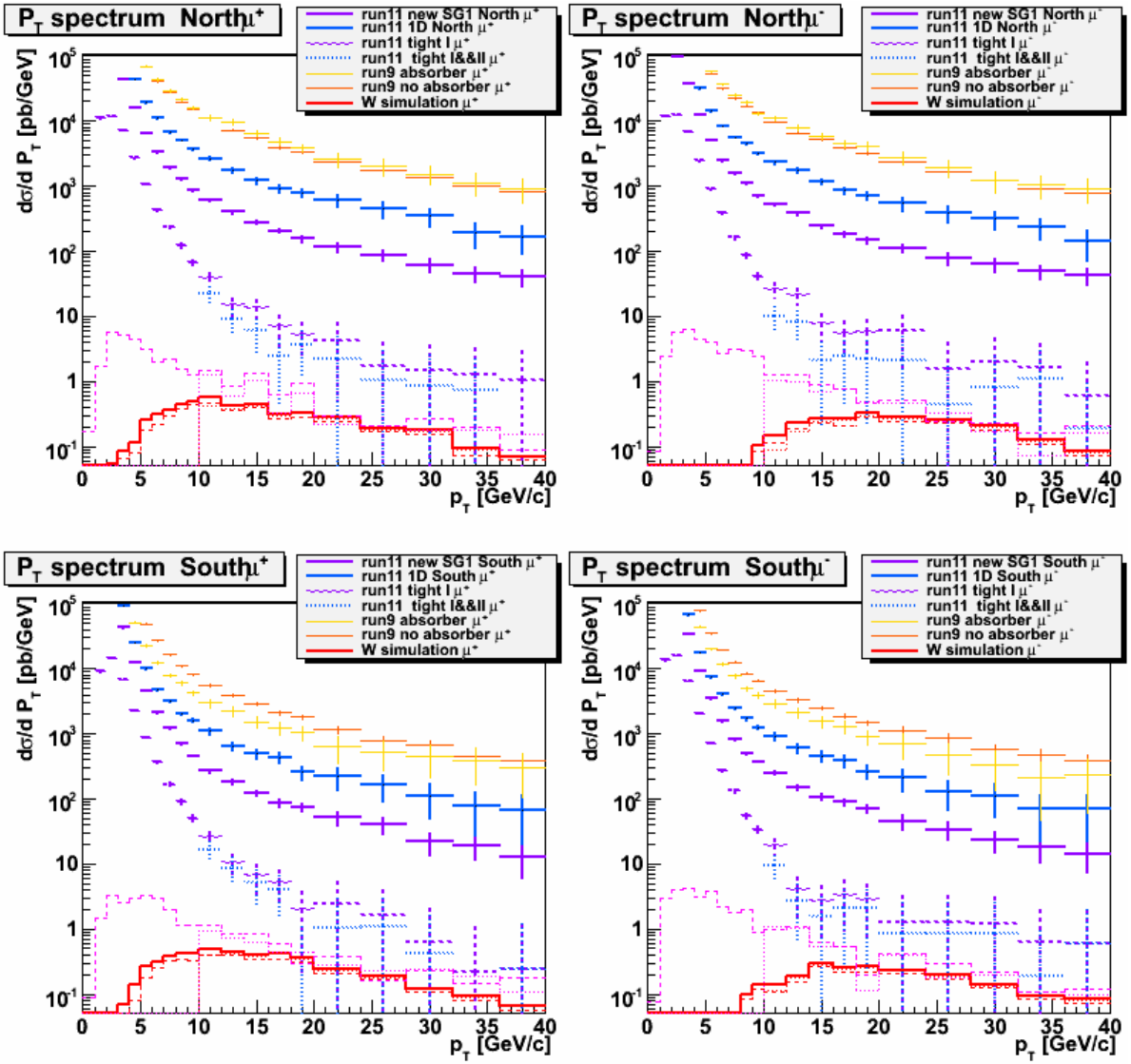
Remainder of p+p run

- PHENIX priority continues to be: integrate luminosity!
  - Original goal was 50 /pb, which is no longer possible
  - 20 /pb will yield

- First physics with new muon triggers and first use of timing from RPCs
- W cross section at forward rapidities
  - We *may* get a first look at the asymmetry, depending on performance and backgrounds
- First measurement of pion A_{LL} to reach $x \sim 10^{-3}$ using the MPC

A Look at Run 11 Muon Data

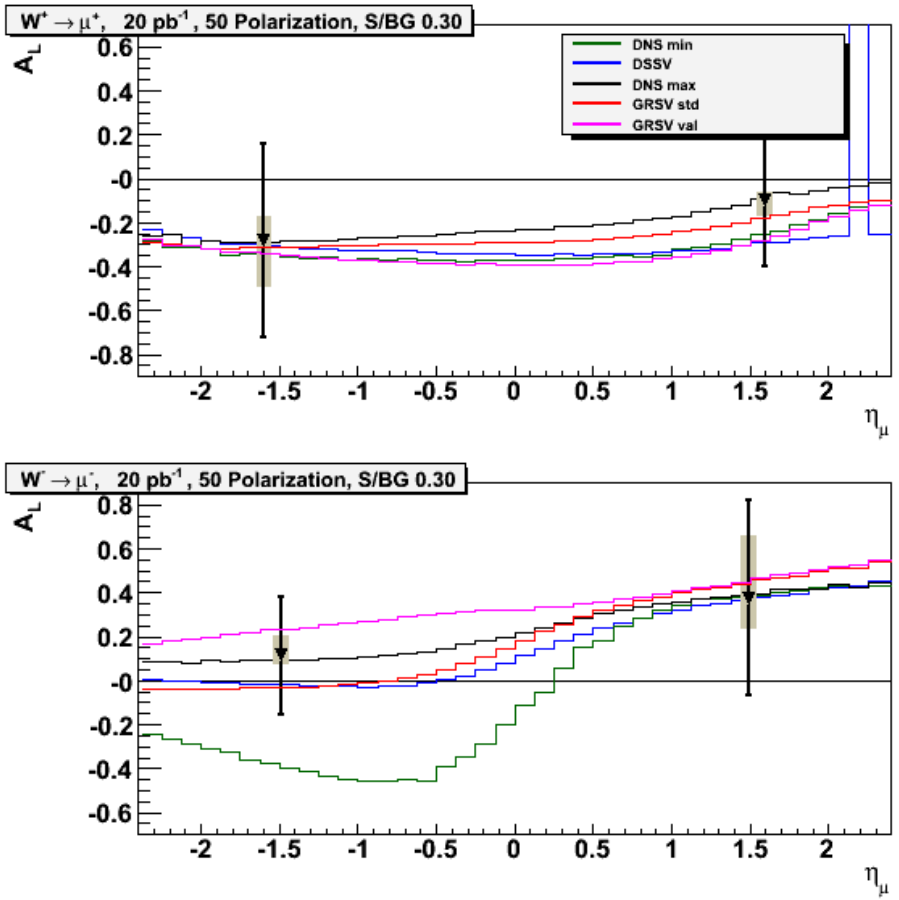
- Tracks triggered with MuID&&BBC&&SG1
  - SG1 uses track sagita in Muon Tracker
  - From first 1.8 pb^{-1} recorded (now 5.98)
- Plotted data:
  - Yellow is Run9
  - Absorber Effect is seen in comparison to Run11 same trigger (blue)
  - Purple is SG1 triggered tracks
  - Dashed are with cuts (***no RPCs yet***)
  - Red is W simulation



W Physics

- W➔μ in forward and backward directions
- Cross section will be done with 20 pb^{-1}.
- First look at forward asymmetries
  - Expectations based on P=50% and L=20pb^{-1}.
  - conservative S/B=0.3

  (S/B corresponds to previously used cuts; RPC timing cuts will certainly improve this)
- Publishable?
  - Depends on final S/B, beam steering, and luminosity

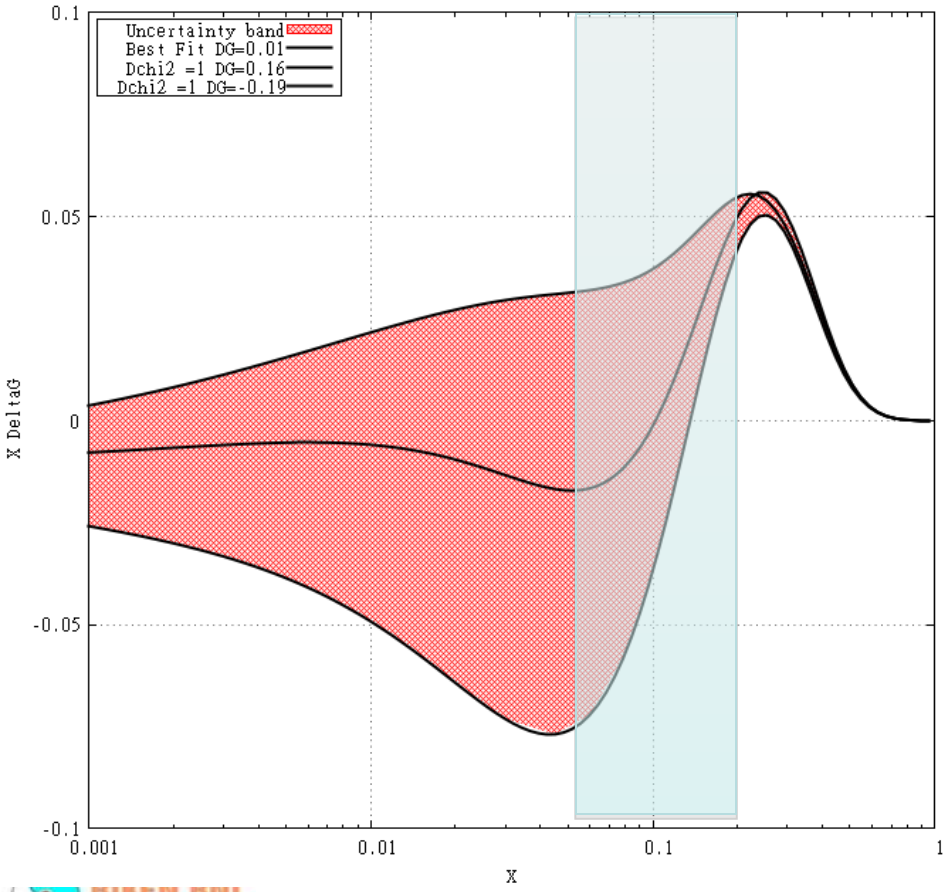


ΔG uncertainty in x range [0.001, 1]

(Shaded area indicates coverage from present PHENIX + STAR data(pi0 and jets)

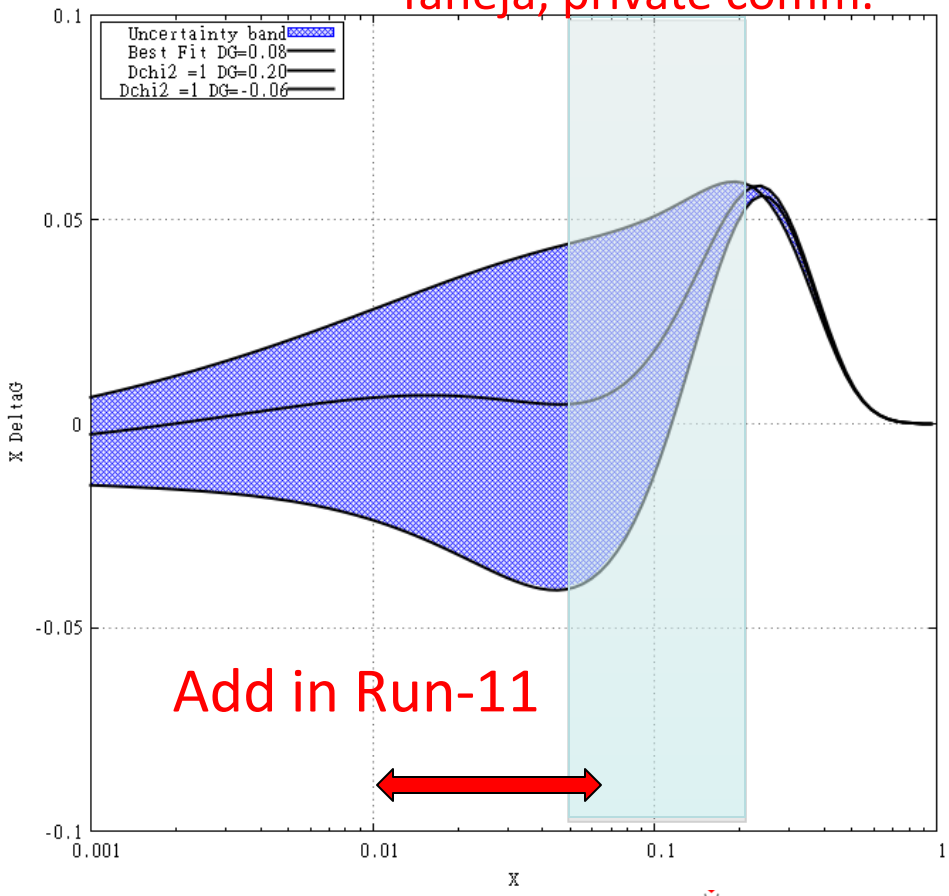
DSSV

arXiv: 0904.382 hep-ph



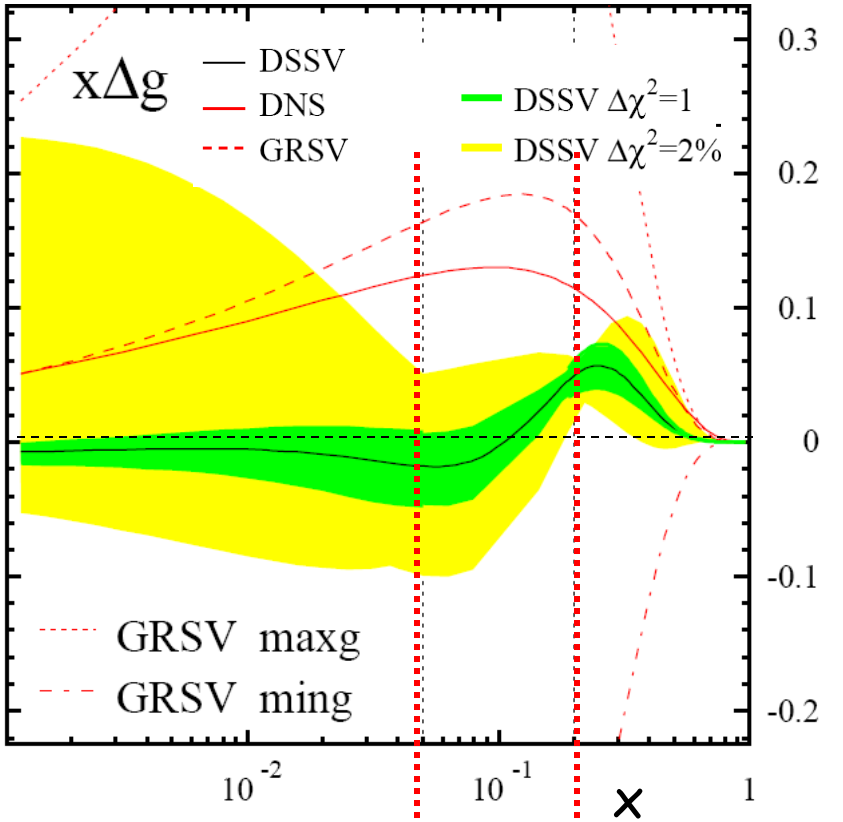
DSSV + RUN9 pi0

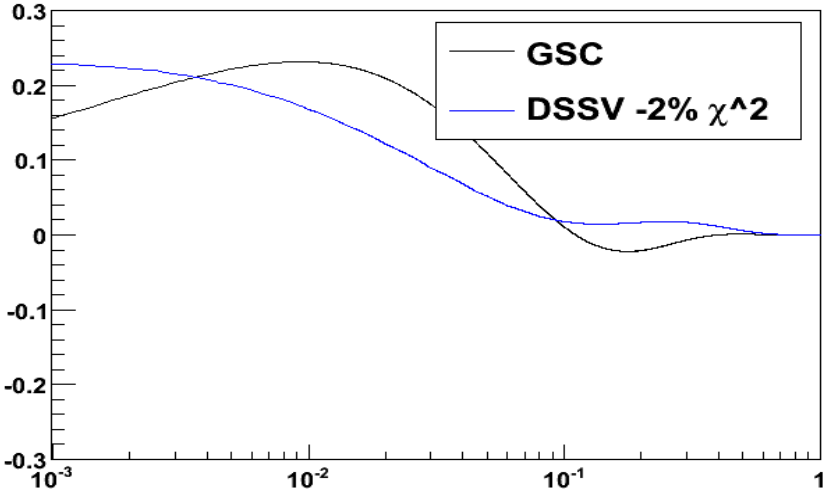
Taneja, private comm.



Δg From NLO Global Fit

error estimates more delicate: small-x behavior completely unconstrained



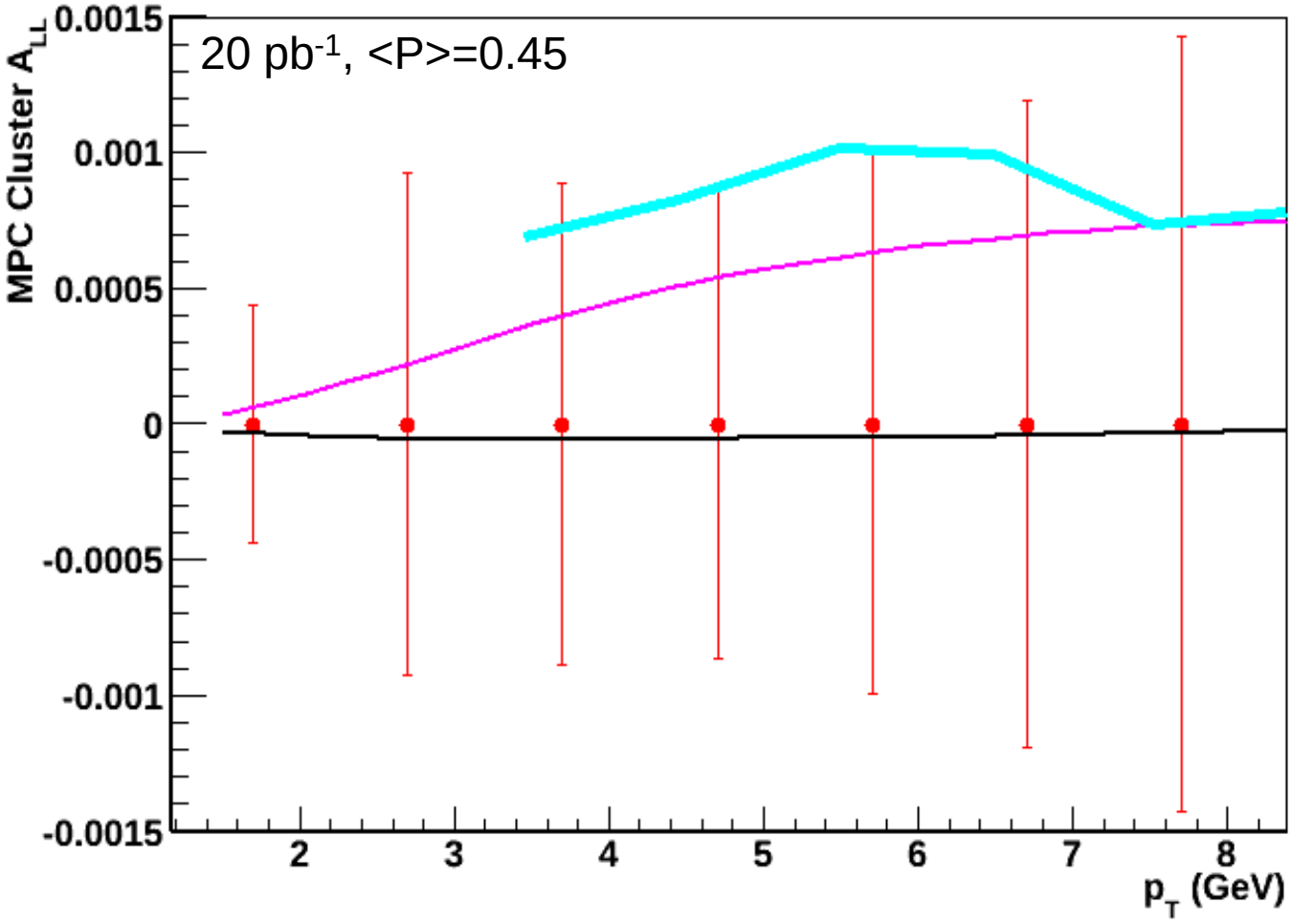


- Current data is sensitive to ΔG for x_{gluon} = 0.05→0.3
- Can have A_{LL} = 0 at midrapidity and still have large Δg at low x (eg. GSC and DSSV 2% curves)

NEED TO EXTEND MEASUREMENTS TO LOWER x
NSAC Milestone M8

Phys.Rev.Lett.101:072001,2008

MPC A_{LL} Projection

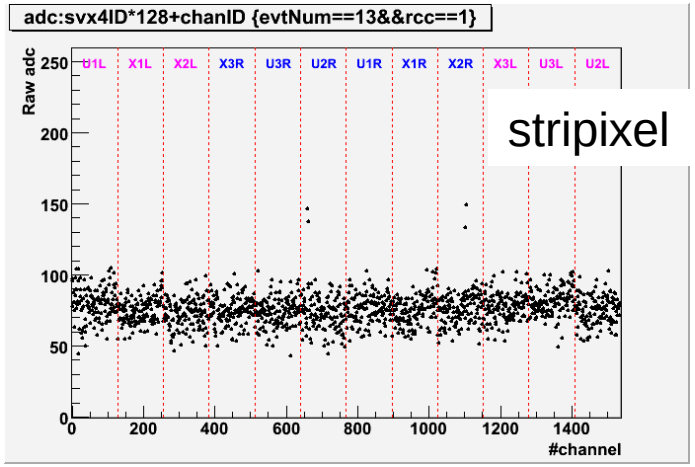


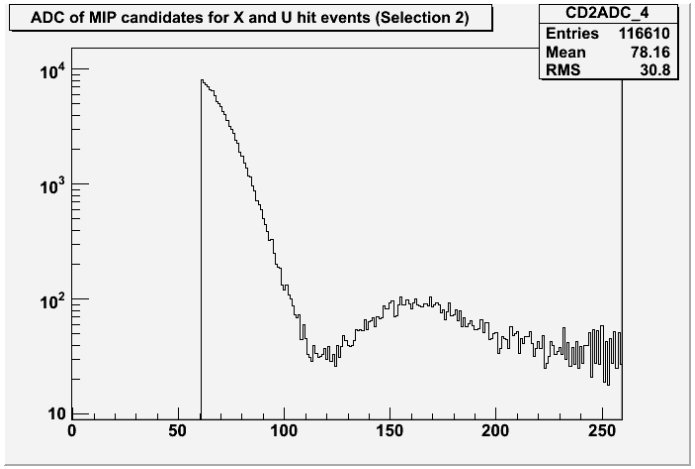
Werner NLO DSSV
Werner NLO GSC
PYTHIA DSSV
($\Delta\chi 2/\chi 2$ =-2%)
Projected MPC A_{LL}

- Projection from recent Run11 data, assuming 20 pb^{-1} and <P>=0.45
- Can constrain (or discover) Δg at low x, sensitive at level of DSSV uncertainties.
  - First constraints for Δg at RHIC down to x ~ 10^{-3}

VTX commissioning

- Detectors are timed in with beam
  - Still some fine adjustments needed
- Work is ongoing to include in normal datastream
- Most work is in parallel to physics data taking
- Need ~2 weeks to commission +several days of data





Conclusions

- We are integrating physics events quickly when we are getting PHYSICS collisions
  - With stable running, we can reach 20 pb^{-1} by the planned end of the p+p running (4/14)
- It is important to get physics out of this run.
- With 20 pb^{-1}, we can get
  - W➔μ cross section
  - A_{LL} measurements sensitive to unmeasured x range for ΔG
  - VTX commissioned