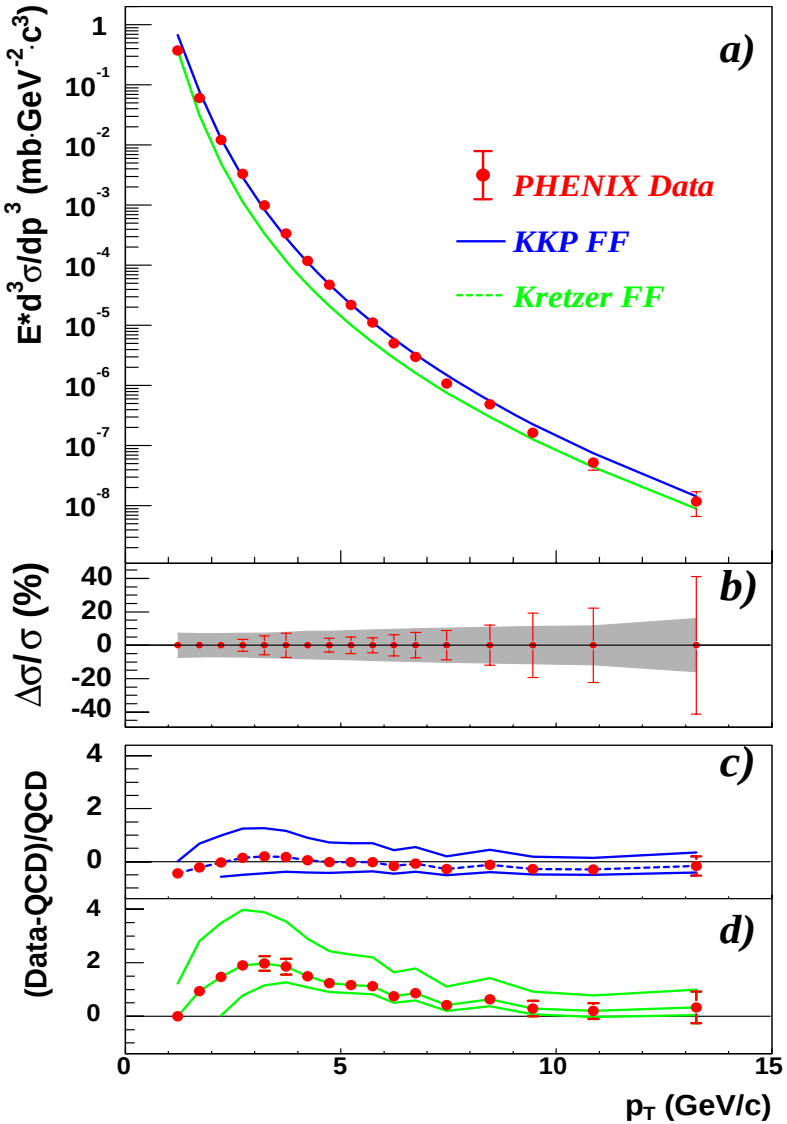
π0 inv. cross section in *pp* at |η|<0.35

PHENIX π^0 cross section at |η|<0.35
Phys.Rev.Lett.91:241803,2003

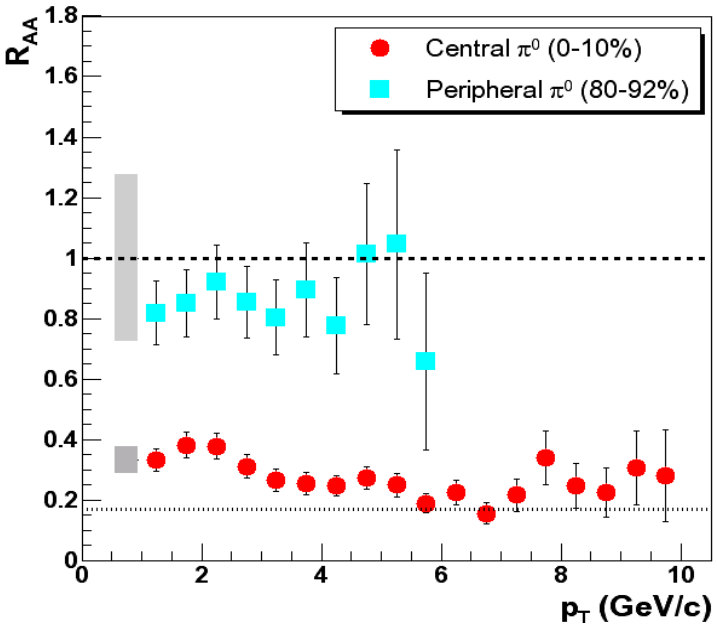


- First results (Run2)
  - PRL91, 241803, 2003
- Run5 preliminary results
  - Extends pT range: 0.5–20 GeV/c
  - Smaller errors
- Results consistent with pQCD calculation
  - Important confirmation of theoretical foundations for spin program
- Provides reference to quantify π0 production in AA and dA collisions
  - To study hot/cold nuclear matter effects

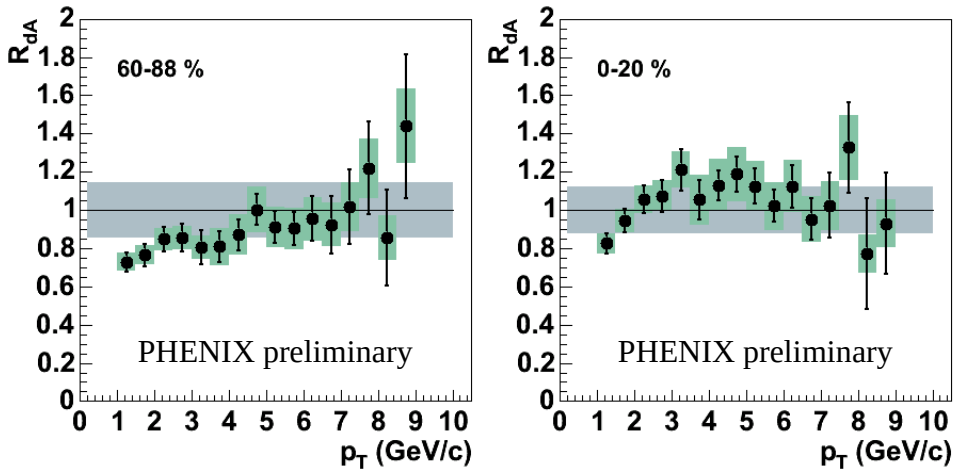
π0 production in heavy ion collisions

$$R_{\mathrm{AB}} = \frac{\mathrm{d}N_{\mathrm{AB}}^{\pi^0} / \mathrm{d}p_{\mathrm{T}}}{\langle T_{\mathrm{AB}} \rangle \mathrm{d}\sigma_{\mathrm{pp}}^{\pi^0} / \mathrm{d}p_{\mathrm{T}}} \qquad \langle N_{\mathrm{coll}} \rangle = \sigma_{\mathrm{pp}}^{\mathrm{inel}} \cdot \langle T_{AA} \rangle$$

PRL 91, 072301 (2003)



Minibias data published in PRL 91, 072303 (2003)
Centrality dependence paper to be submitted to PRL soon



High pT hadron suppression in central heavy ion collisions at $\sqrt{s_{NN}}$=130 and 200 GeV

Cold nuclear matter effects:
- No suppression
- Slight pT and centrality dependence

$\pi 0$ A_{LL}

First results (Run3):

PRL93, 202202 (2004)

Update (Run3+4):

PRD73, 091102(R) (2006)

Run5:

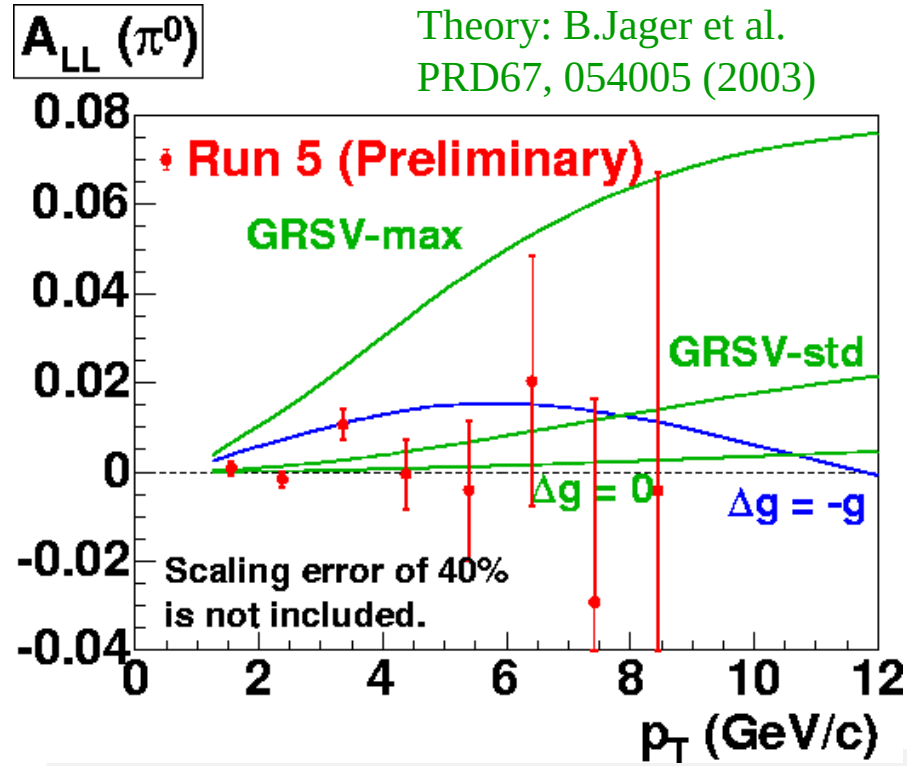
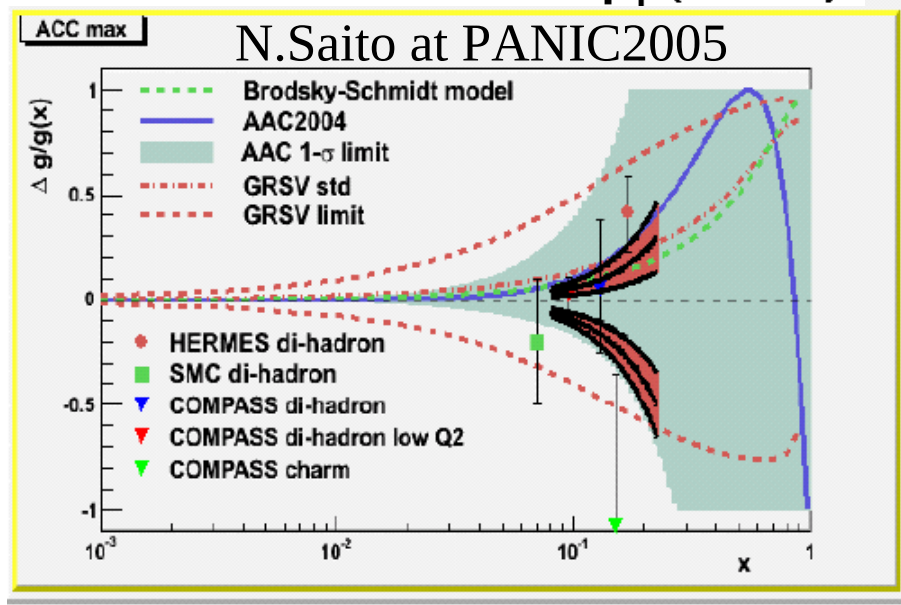
presented at PANIC05

Run6:

will be presented at SPIN06
errors will decrease by a factor of ~2.5

$$A_{LL} = \alpha\left(\frac{\Delta g}{g}\right)^2 + \beta\left(\frac{\Delta g}{g}\right) + \gamma$$

Theory: B.Jager et al.
PRD67, 054005 (2003)



N.Saito at PANIC2005