Student self-introduction -Inseok Yoon.

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Yoon Inseok.

SNU/RIKEN

1. Personal

- Born in Pohang, Korea and grown up in Seoul, Korea.

- Bachelor of physics, SNU (2007-2011)
  - Joined Reno experiment as summer school student.

- Graduate school of physics, SNU (2011-current)
  - Joined Kiyoshi's Lab (2011)
  - Took first shift at PHENIX on Run12
  - In earnest, I've worked on PHENIX since Run13.

- Hobby
  - Marine aquarium: feeding fish and corals.
  - Working around my town with my wife and dog.
  - Watching or playing baseball.


DOOSAN
BEARS
SEOUL

2. My works in PHENIX

- Mutr maintenance. (Recap.)

- ERT Expert since 2013.
  - ERT commissioning, and monitor and update ERT status.

- Run13 spin DB update

- Run13 Relative luminosity study.
  - Width, pileup and residual correction.

3. Thesis Topic: Mid-rapidity $A_{LL}^{\pi^0}$ at $\sqrt{s} = 510$ GeV

- Spin sum rule: $\frac{1}{2} = \int_0^1 dx \left[\frac{1}{2}\sum_q (\Delta q + \Delta\bar{q})(x,\mu^2) + \Delta g(x,\mu^2)\right] + L$

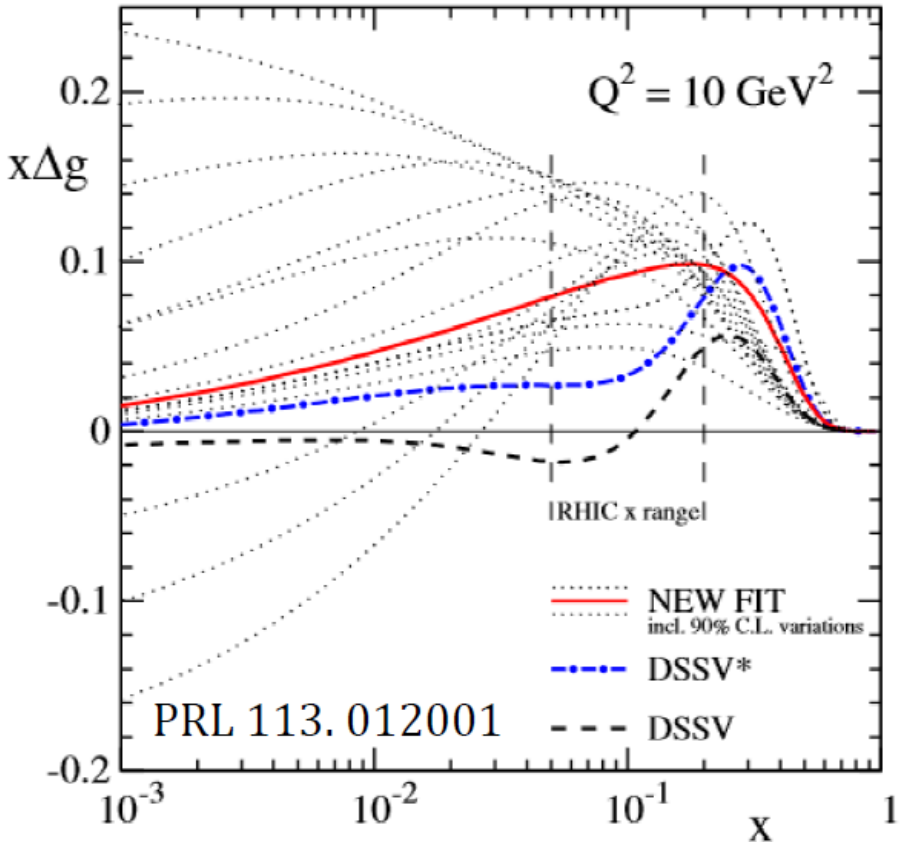
  DIS experiment: quark contribution is only 25~35%.

  Gluon polarization, $\Delta G = \int_0^1 dx \Delta g(x)$

- PP collision provide access to Δg through gg and qg scattering.

- $A_{LL}^{\pi^0}$ measurements give access to Δg

- $A_{LL}^{\pi^0}$ at higher $\sqrt{s} = 510$GeV extends the sensitivity to Δg to lower Bjorken x.

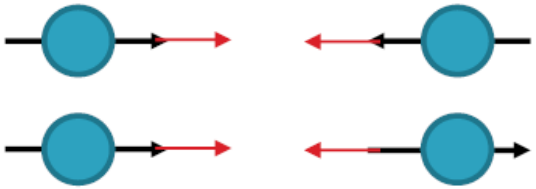


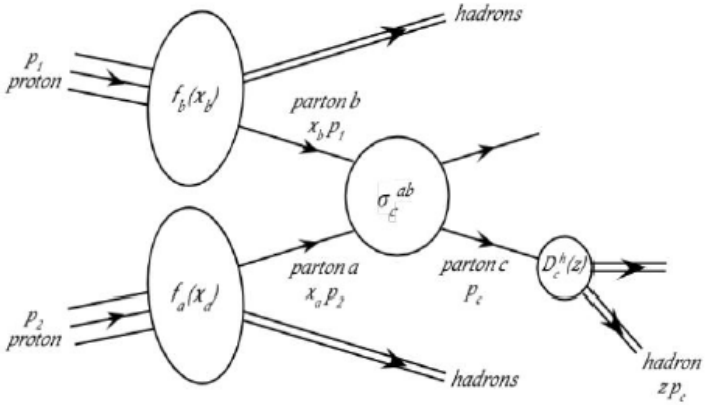
3. Thesis Topic: Mid-rapidity $A_{LL}^{\pi^0}$ at $\sqrt{s} = 510$ GeV

- $A_{LL}^{\pi^0} = \frac{1}{P_B P_Y} \frac{\sigma_{++}^{\pi^0} - \sigma_{+-}^{\pi^0}}{\sigma_{++}^{\pi^0} + \sigma_{+-}^{\pi^0}}$

$\sigma_{++}^{\pi^0} : \sigma^{\pi^0}$ from same helicity proton collision.

$\sigma_{+-}^{\pi^0} : \sigma^{\pi^0}$ from opposite helicity proton collision.





$\sigma^{f_a f_b \to f_c X}$: pQCD

$D_{f_c}^{\pi^0}$: e^+e^- experiment

- $A_{LL}^{\pi^0} = \frac{\sigma^{\pi^0}{}_{++} - \sigma^{\pi^0}{}_{+-}}{\sigma^{\pi^0}{}_{++} + \sigma^{\pi^0}{}_{+-}} = \frac{\sum_{f_a, f_b, f_c} \Delta f_a \otimes \Delta f_b \otimes d\hat{\sigma}^{f_a f_b \to f_c X} \otimes D_{f_c}^{\pi^0}}{\sum_{f_a, f_b, f_c} f_a \otimes f_b \otimes \hat{\sigma}^{f_a f_b \to f_c X} \otimes D_{f_c}^{\pi^0}}$

3. Thesis Topic: Mid-rapidity $A_{LL}^{\pi^0}$ at $\sqrt{s} = 510$ GeV

- Count yield of signal and side region.

- $A^{Peak(Side)}{}_{LL} = \frac{1}{P_B P_Y} \frac{\sigma_{++} - \sigma_{+-}}{\sigma_{++} + \sigma_{+-}}$

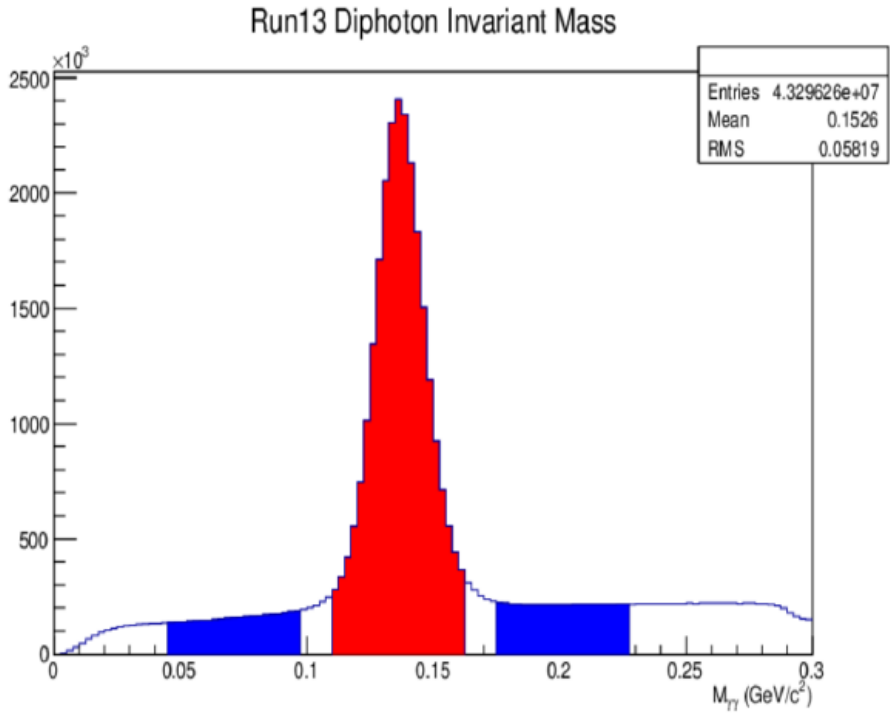
$$= \frac{1}{P_B P_Y} \frac{\frac{N_{++}}{\varepsilon_{++} L_{++}} - \frac{N_{+-}}{\varepsilon_{+-} L_{+-}}}{\frac{N_{++}}{\varepsilon_{++} L_{++}} + \frac{N_{+-}}{\varepsilon_{+-} L_{+-}}}$$

$$= \frac{1}{P_B P_Y} \frac{N^{Peak(Side)}{}_{++} - R N^{Peak(Side)}{}_{+-}}{N^{Peak(Side)}{}_{++} + R N^{Peak(Side)}{}_{+-}},$$

where $R = \frac{L_{++}}{L_{+-}}$. (source of syst.)

- $A_{LL}^{\pi^0} = \frac{A_{LL}^{Peak} - r A_{LL}^{Side}}{1 - r}$,

r = background fraction.



↑. Identifiable mass peak.
Large stat.
Various cuts to minimize uncert.

3. Thesis Topic: Mid-rapidity $A_{LL}^{\pi^0}$ at $\sqrt{s} = 510$ GeV