STAR Plans
- RUN 9 BUR -

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On behalf of the STAR Collaboration

Outline

- Recent results
  - Brief overview of Run 6 and Run 8 goals / performance
  - Transverse spin results and impact - Run 6
  - Longitudinal spin results and impact - Run 6
- Run 9 Beam Use Request
  - Overview
  - Assumed Run 9 projected performance
  - Physics measurements

Recent results - Run 6

- Brief overview of Run 6 goals / performance

Energy $\sqrt{s_{NN}}$ (GeV)	Trigger	System	Acquired	Goal
200 (longitudinal)	Rare (BEMC /EEMC Triggered)	p + p	8.5 pb^{-1}, P ~ 60% FOM ~ 830 nb^{-1}	10 pb^{-1}, P ~ 50% FOM ~ 625 nb^{-1}
200 (transverse)	Rare (Di-Jet)	p + p	3.34 pb^{-1} sampled, P ~ 60%	~3 pb^{-1} sampled* P ~ 50%
200	L2 J/Ψ	p + p	3.17 M events	3 M events
62.4	Minimum Bias	p + p	16.2 M events	15 M events

Recent results - Run 6

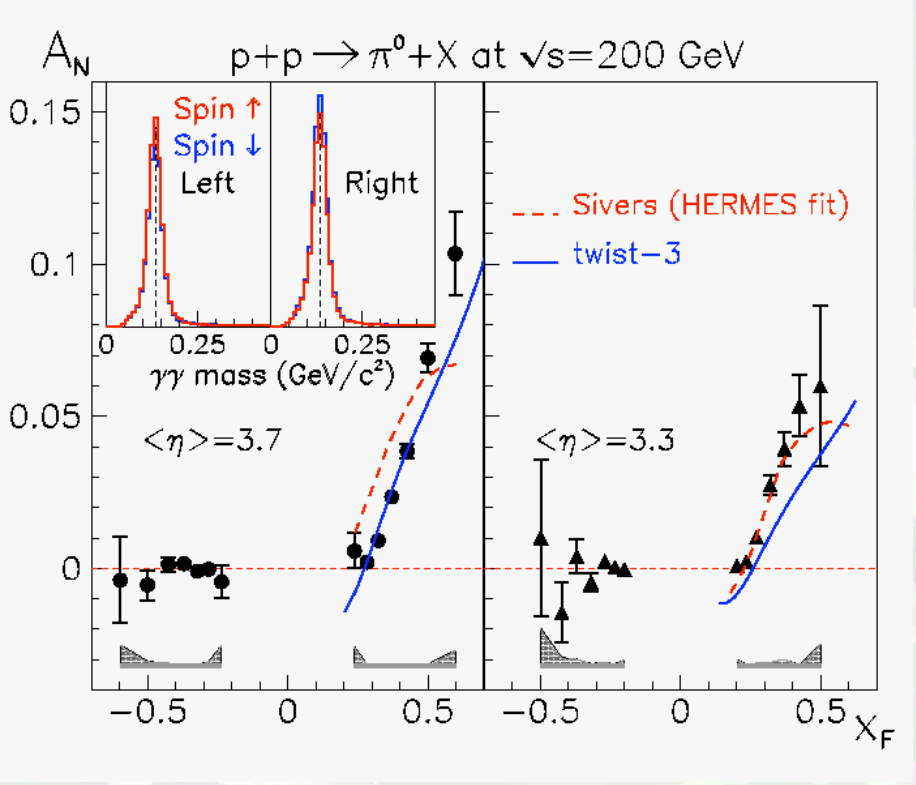
- Brief overview of Run 8 goals / performance

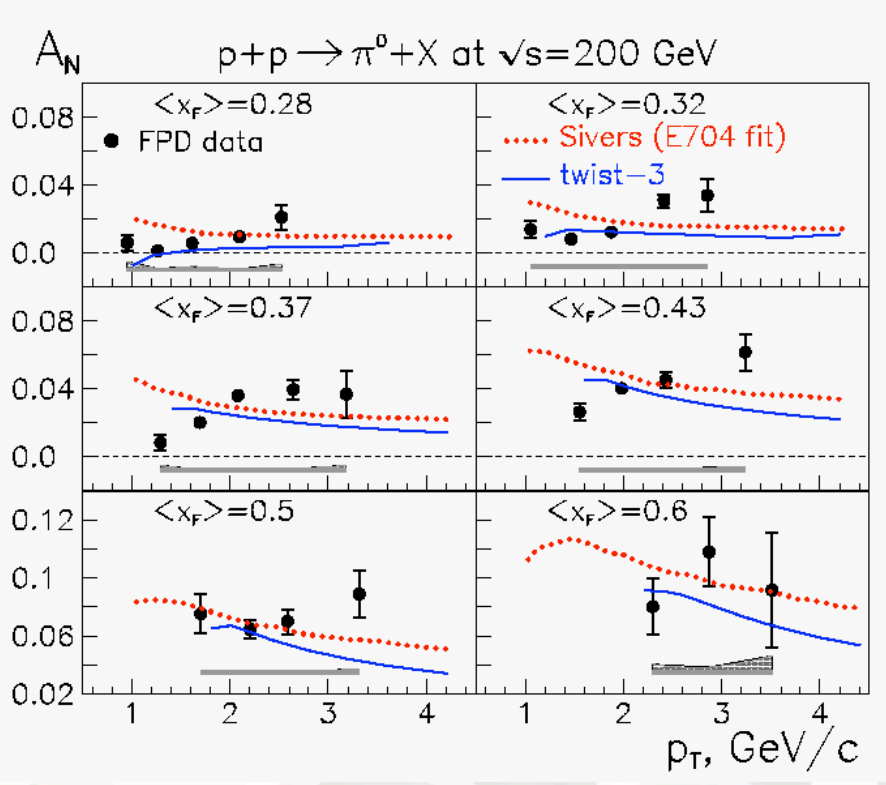
System	Trigger	Goal	Acquired
d+Au	FMS	Original: 60 nb^{-1} Reduced: 30 nb^{-1}	49 nb^{-1}
d+Au	BEMC High Tower	30 nb^{-1}	36 nb^{-1}
d+Au	Minimum bias	30 M usable events	46 M usable events
p+p	FMS integrated luminosity	9 pb^{-1}	7.8 pb^{-1}
p+p	FMS integrated figure-of-merit (P^2L)	3.8 pb^{-1}	1.6 pb^{-1}
p+p	BEMC High Tower	4.5 pb^{-1}	3.1 pb^{-1}
Low-energy test	Minimum bias	Few thousand good events	Few thousand good events

Recent results - Run 6

- Transverse spin results and impact: A_N - Forward Neutral pions

Submitted to PRL, hep-ex/0801.2990





- Run 6 results consistent with previous results
- A_N calculations (Sivers / Twist-3) in comparison to precise x_F dependence of measured A_N
- Measured A_N is not found to decrease in p_T in all x_F bins
- In contrast: Theoretical models predict A_N to decrease with p_T

Recent results - Run 6

- Transverse spin results and impact: A_N - Di-Jet production

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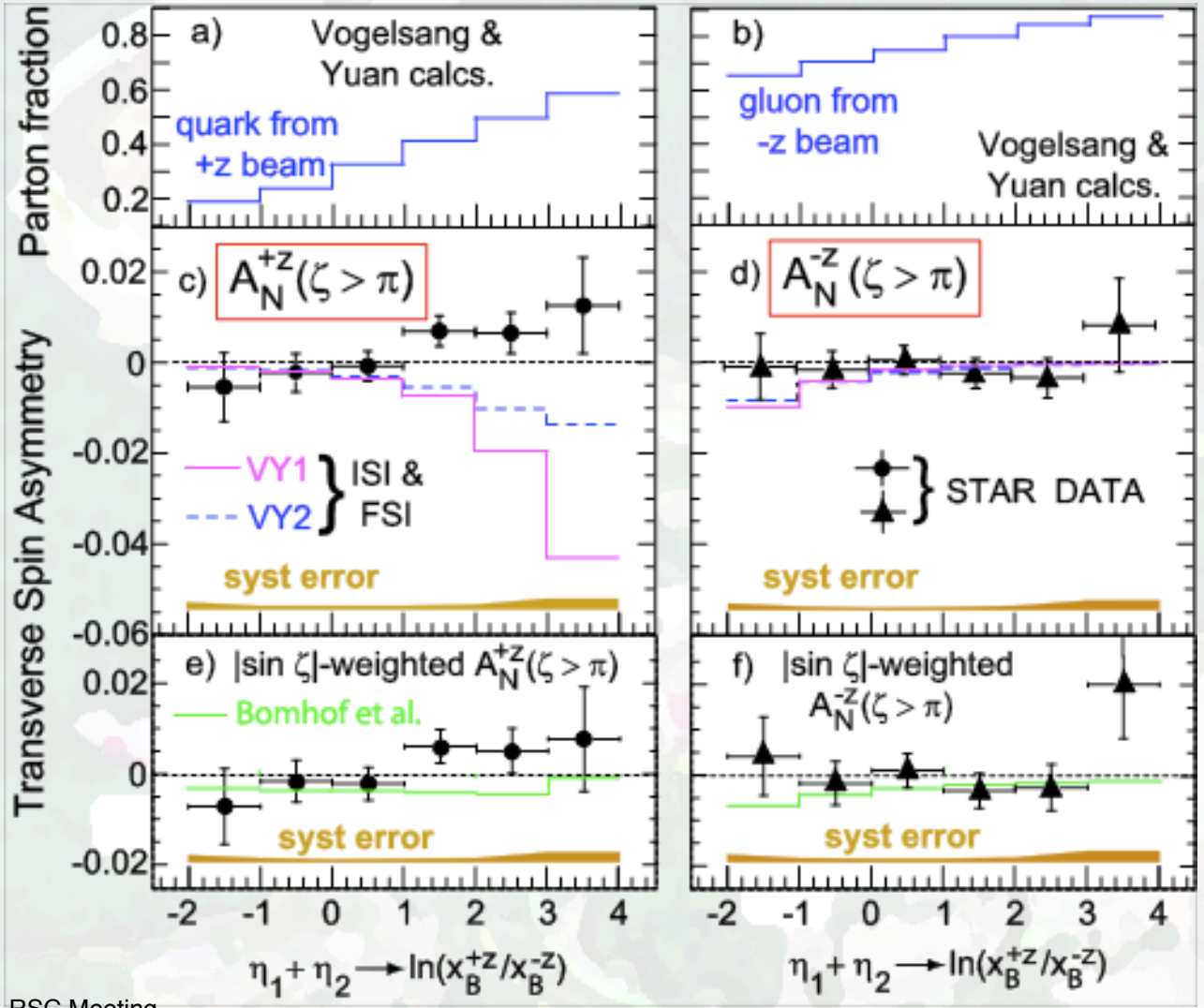
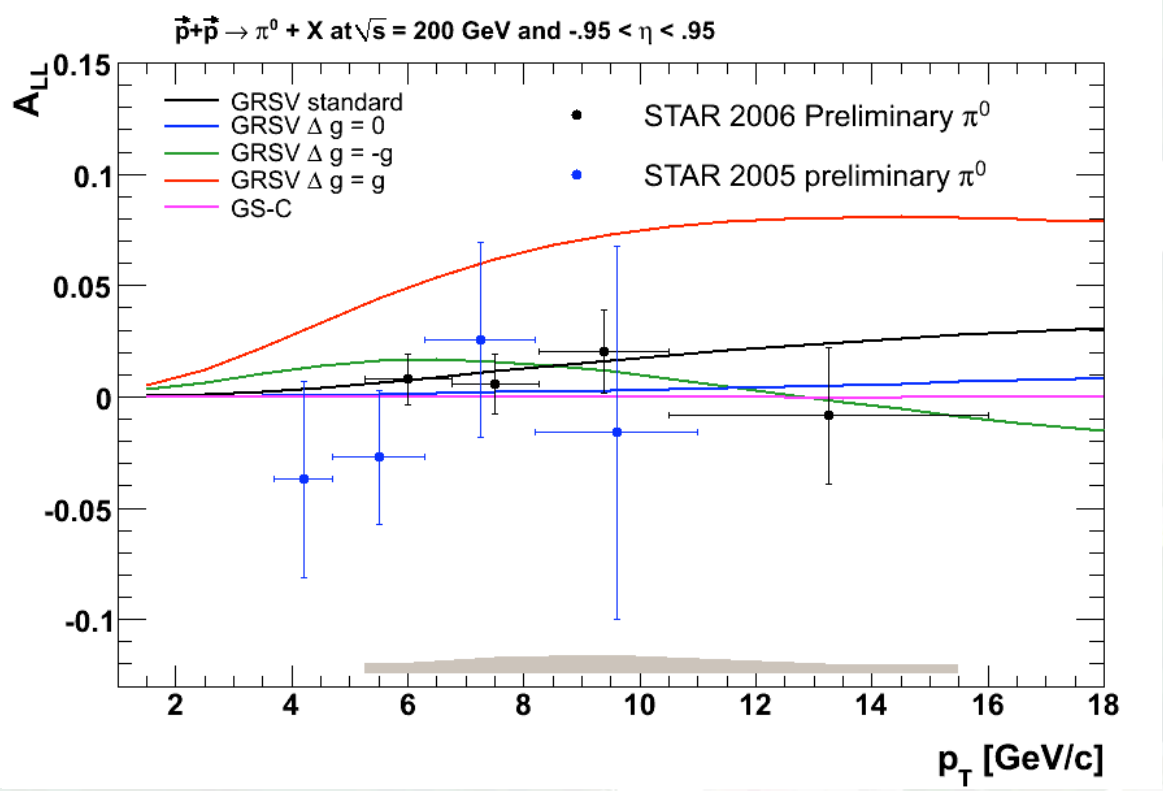


- Di-jet Sivers calculations (VY1 / VY2) based on HERMES extracted quark Sivers functions
- Measured A_N di-jet asymmetries are found to be consistent with zero
- Both net high-x quark and low-x gluon Sivers effects 10 smaller in pp di-jet compared to SIDIS Sivers asymmetry

Recent results - Run 6

- Longitudinal spin results and impact: A_{LL} - Neutral Pion Production - BEMC



χ^2/ndf for NLO

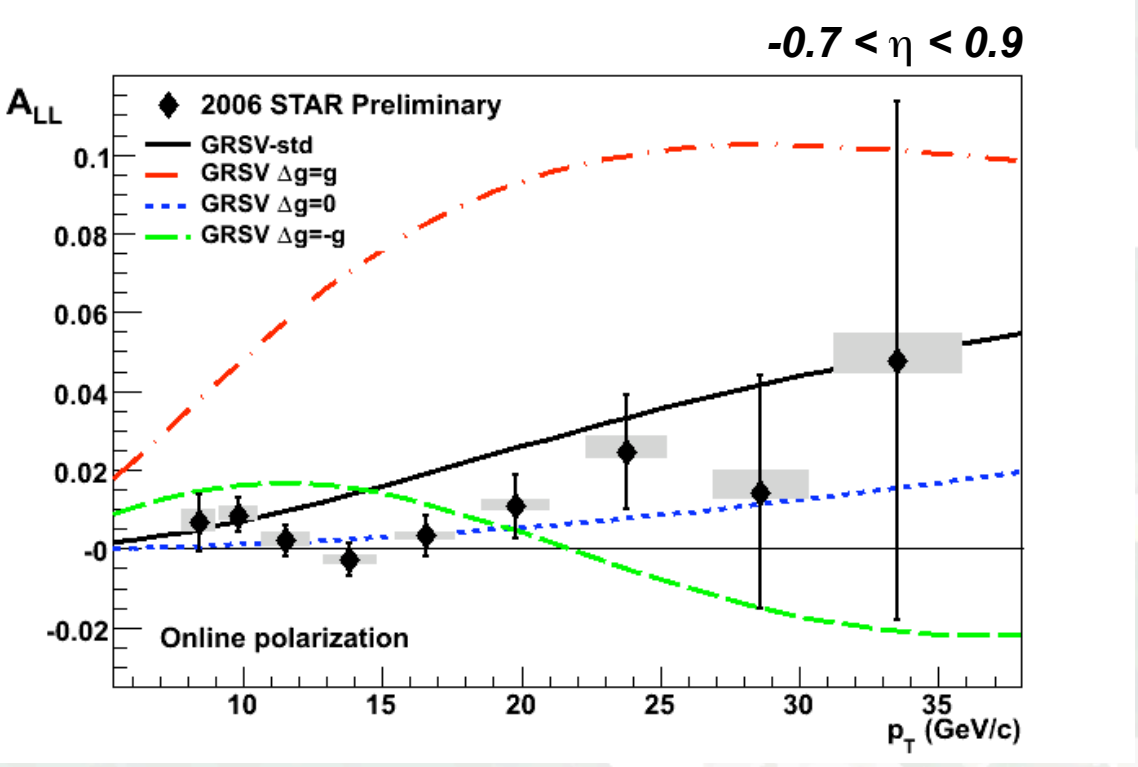
Models:

GRSV Std:	0.3
GRSV Max:	11.4
GRSV Min:	0.3
GRSV Zero:	0.4
GS-C:	0.5

- RUN 6 results: GRSV-MAX ruled out
- Significant increase in statistical precision as well as greater p_T reach compared to previous Run 5 Neutral Pion result
- New A_{LL} result for Neutral Pions in EEMC region will be released for APS Spring 2008 meeting

Recent results - Run 6

- Longitudinal spin results and impact: A_{LL} - Inclusive Jet production

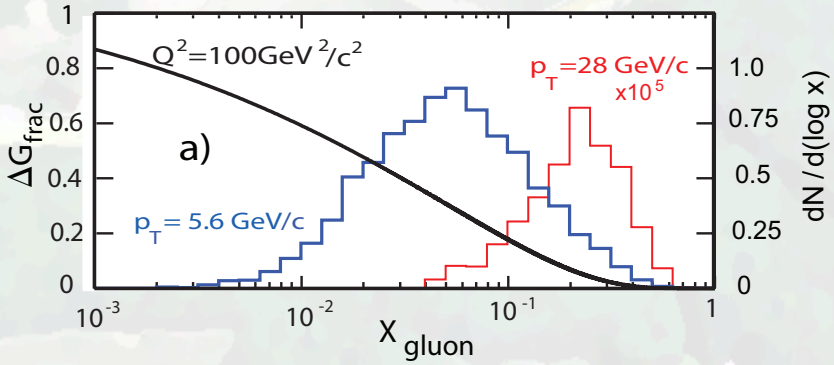


$$\Delta G(Q^2) = \int_0^1 \Delta g(x, Q^2) dx$$

$$\Delta G(Q^2 = 1\,\mathrm{GeV}^2) \approx 1.8$$

$$\Delta G(Q^2 = 1\,\mathrm{GeV}^2) \approx 0.4$$

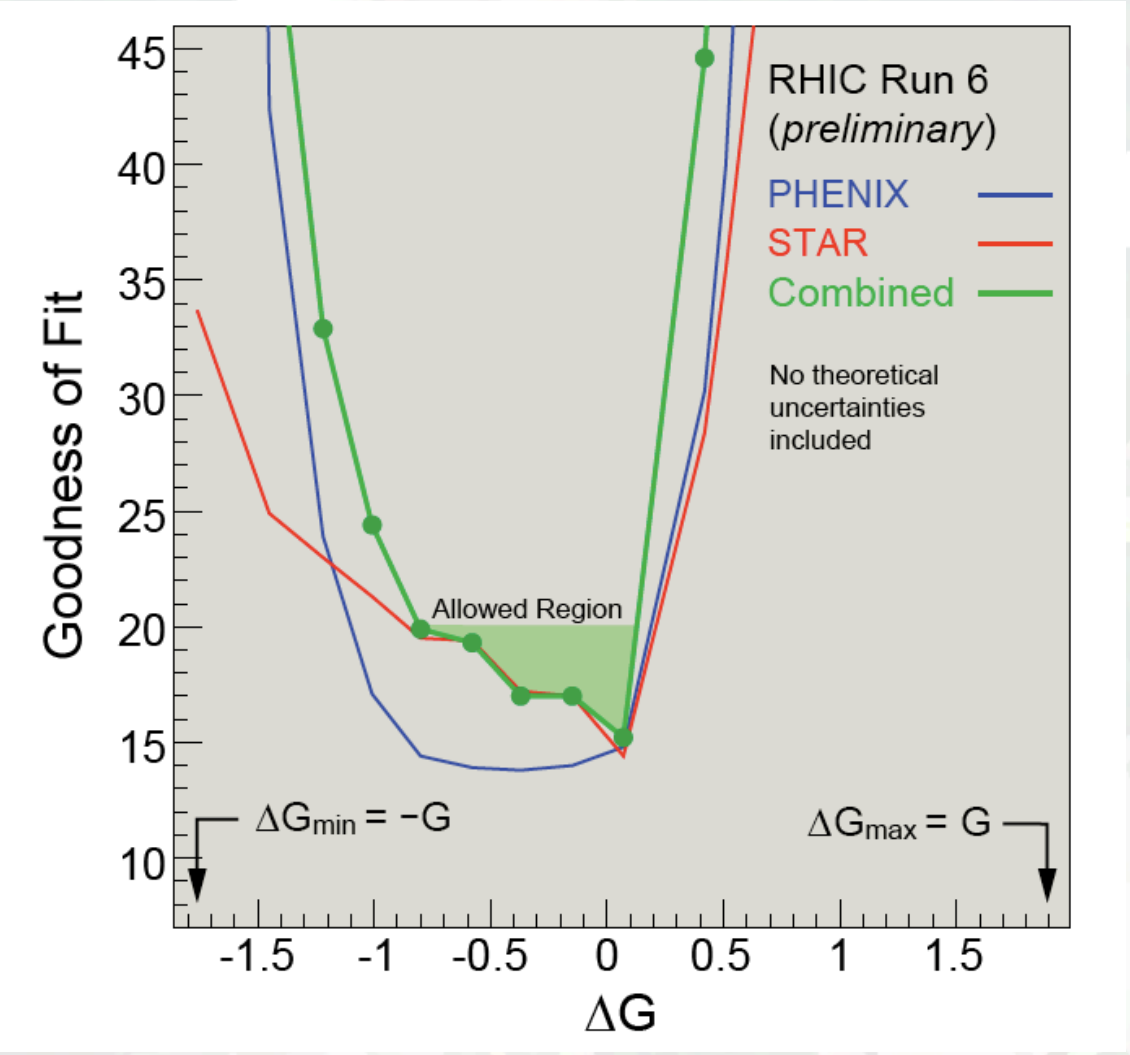
$$x_{\mathrm{parton}} \simeq 2p_T/\sqrt{s}$$

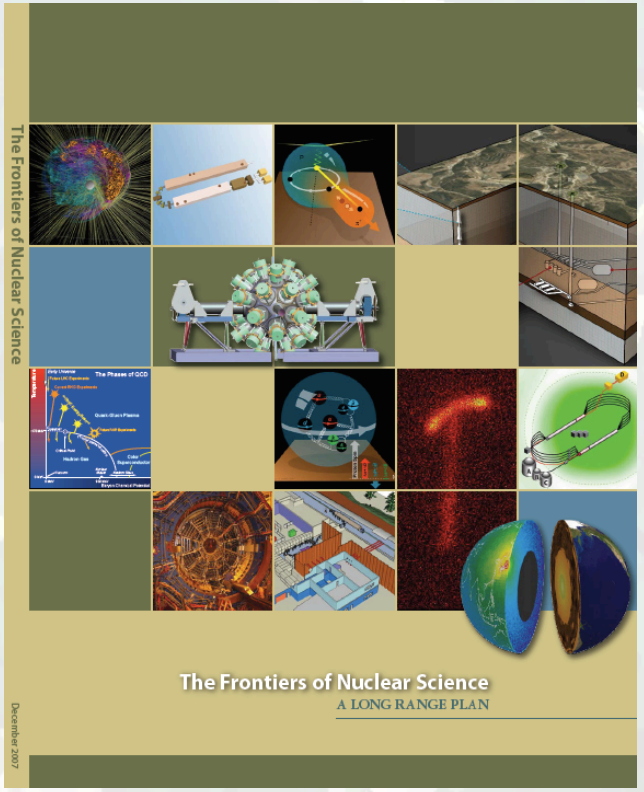


- RUN 6 results: GRSV-MAX / GRSV-MIN ruled out - A_{LL} result favor a gluon polarization in the measured x-region which falls in-between GRSV-STD and GRSV-ZERO
- Consistent with RUN 5 result (Factor 3-4 improved statistical precision for p_T>13GeV/c)

Recent results - Run 6

- Longitudinal spin results and impact: A_{LL} - Inclusive Jet production



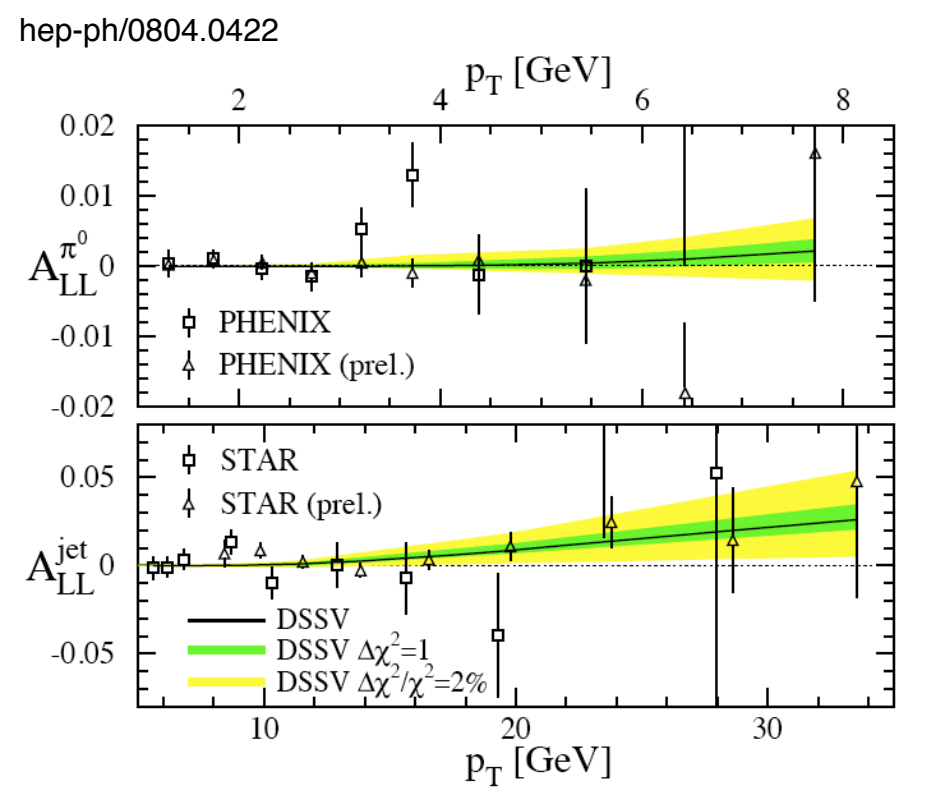


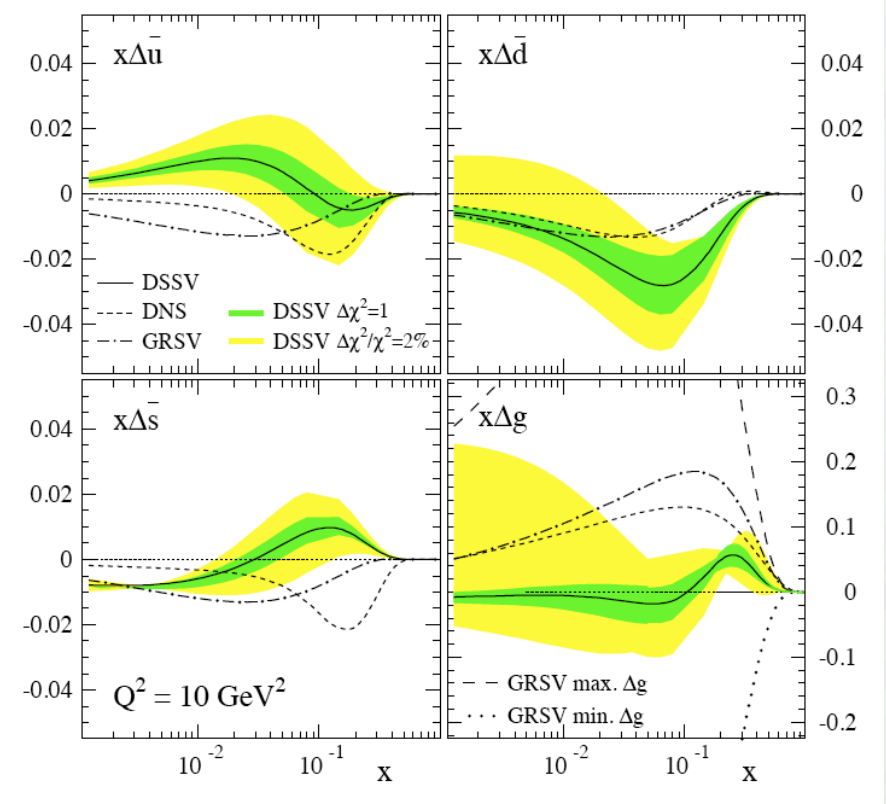
- Featured in 2007 long-range plan NSAC document

http://www.er.doe.gov/np/nsac/docs/Nuclear-Science.Low-Res.pdf

Recent results - Run 6

- Longitudinal spin results and impact: First global analysis using RHIC SPIN data

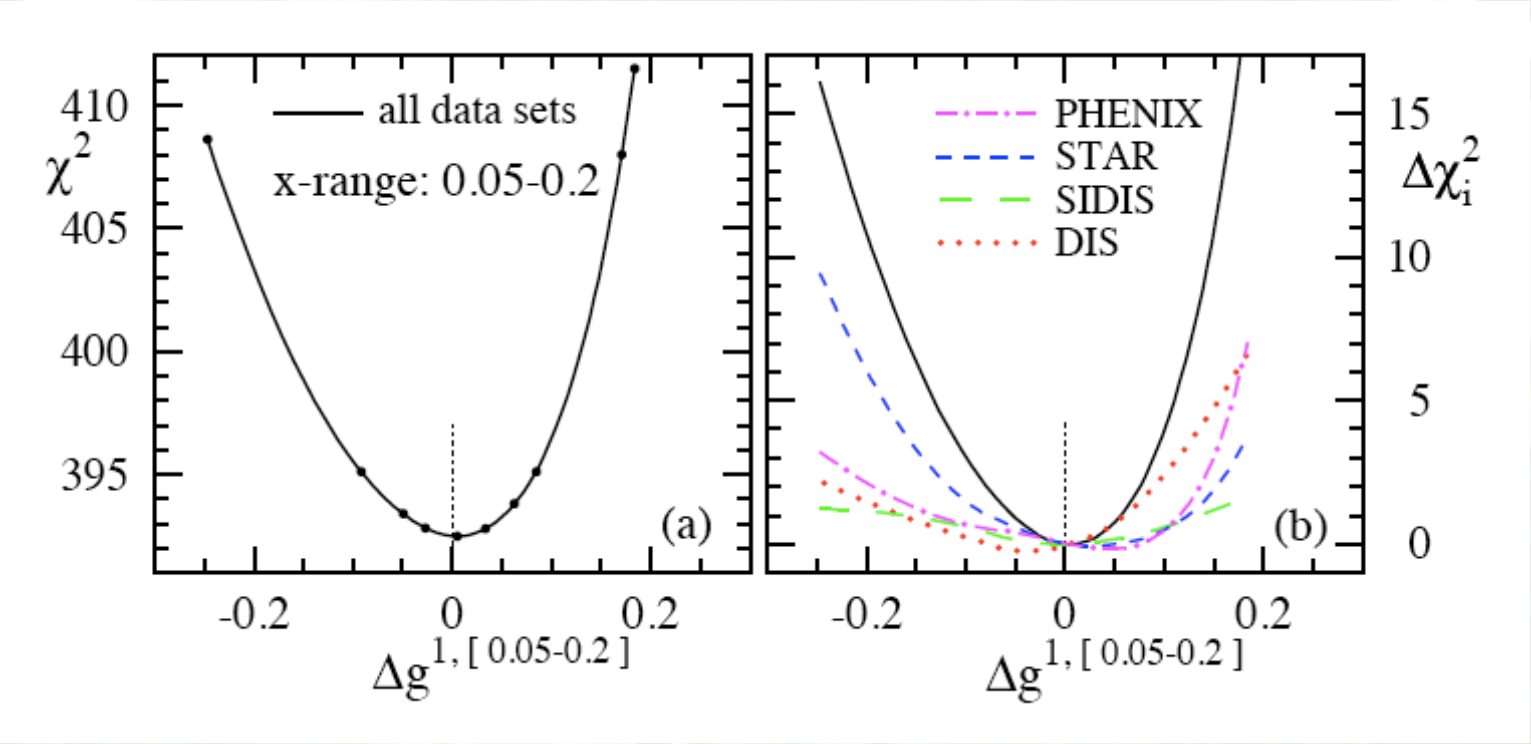




- Congratulations to Daniel, Marco, Rodolfo and Werner for the first global analysis based on the polarized DIS, polarized SDIS and polarized pp data
- Evidence for a small gluon polarization over a limited region of momentum fraction

Recent results - Run 6

- Longitudinal spin results and impact: First global analysis using RHIC SPIN data



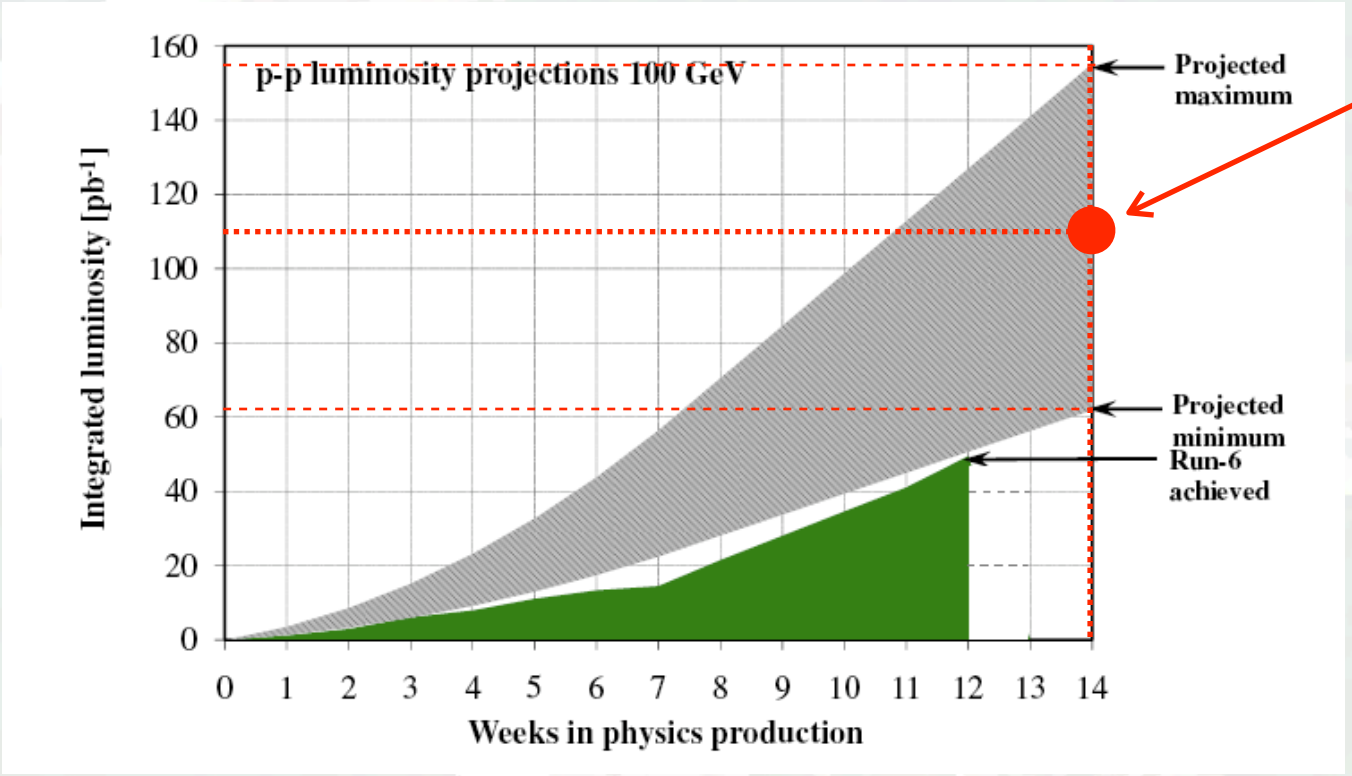
- Strong constraint on the size of Δg from RHIC data for $0.05<x<0.2$
- Important: Mapping x-dependence and extension of x-coverage needed!

Run 9 Beam Use Request

- Longitudinal spin results and impact: First global analysis using RHIC SPIN data
  - Assume 26 cryo-week scenario for the following discussion
  - Primary goal: Large longitudinal pp data sample at 200GeV
  - Possible STAR BUR run-plan (26 week scenario):
    - Time for cool-down, set-up, ramp-up and warm-up: 7 weeks (2 mode scenario)
    - 200 GeV running: ~ 14 (12) weeks - Collect 50pb^{-1} (Recorded luminosity)
    - 500GeV development: ~ 2 (4) weeks
    - pp2pp running (Under discussion!)
    - Au-Au running: ~ 3 weeks (ALD request for: Transverse stochastic cooling)

Run 9 Beam Use Request

- Assumed Run 9 projected performance



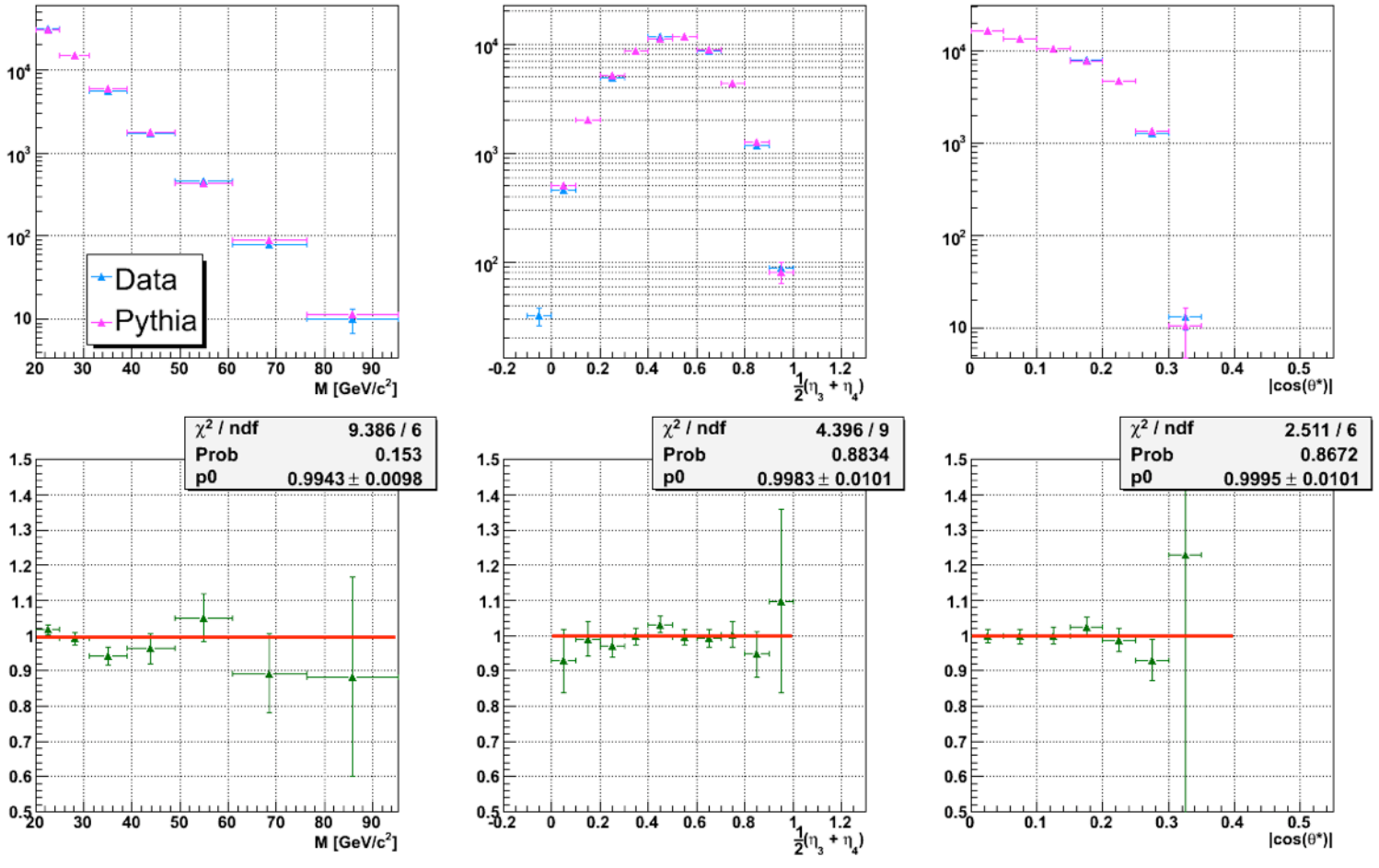
Projections following recent RHIC retreat: P = 0.60 - 0.65 / L_{ave} = $40 \cdot 10^{30}$ $cm^{-2}s^{-1}$

STAR BUR is based on: P = 0.6 / 110pb^{-1} in 14 weeks

Goal: FOM ~ 6.5pb^{-1}

Run 9 Beam Use Request

Di-Jet production - Data Understanding

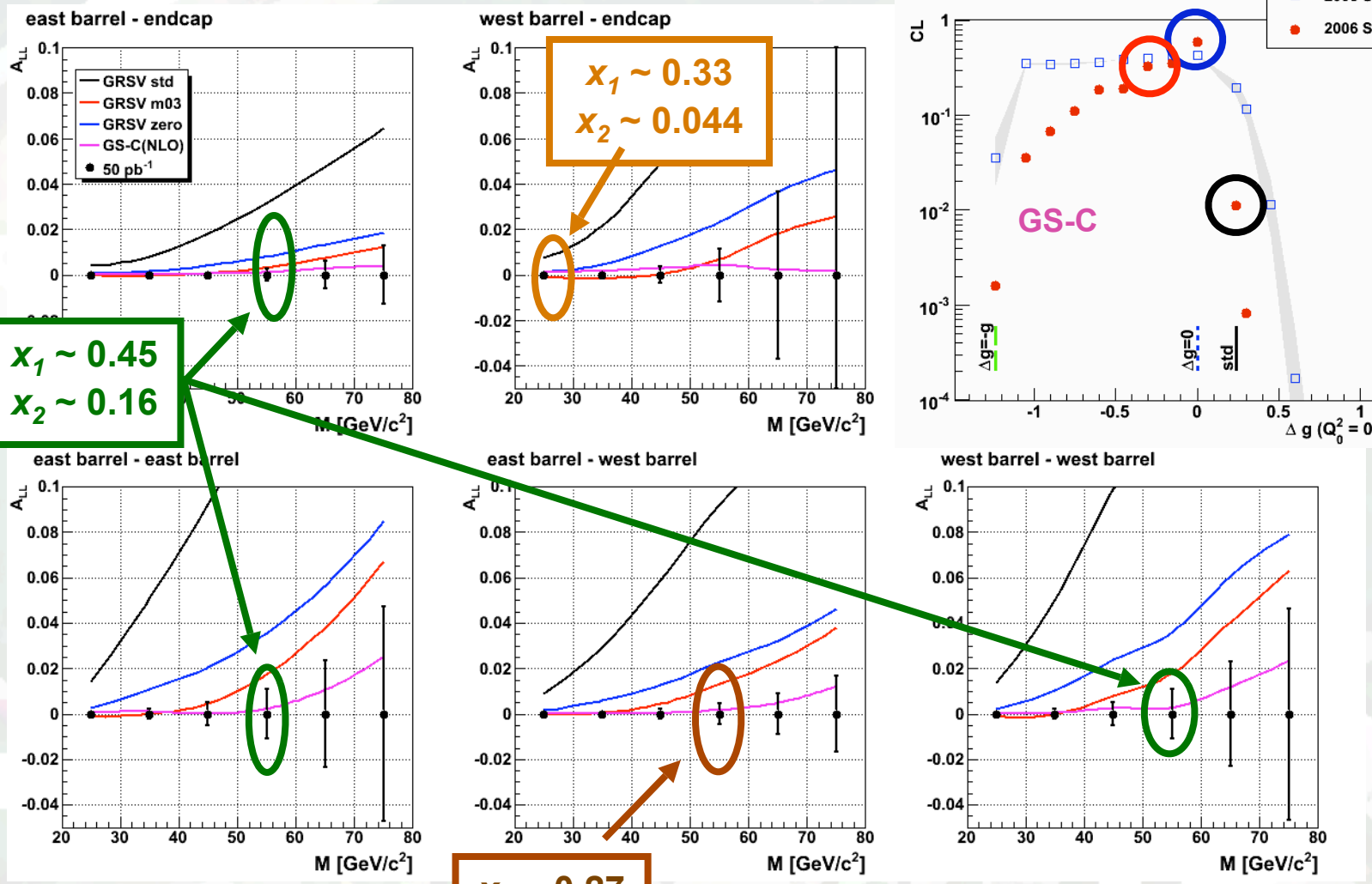


- Data/MC comparison complete - Good agreement in Di-Jet variables
- First cross-section and A_{LL} measurement in progress

$$M \propto \sqrt{x_1 x_2} \qquad \eta_3 + \eta_4 \propto \log\left(\frac{x_1}{x_2}\right)$$

Run 9 Beam Use Request

- Di-Jet production - Projections



Run 9 Beam Use Request

- Other measurements
  - Inclusive jet production: Focus on high p_T region
  - Hadron production
  - Photon measurements
  - Studies and projections are in preparation!