STAR Plan for Run 11

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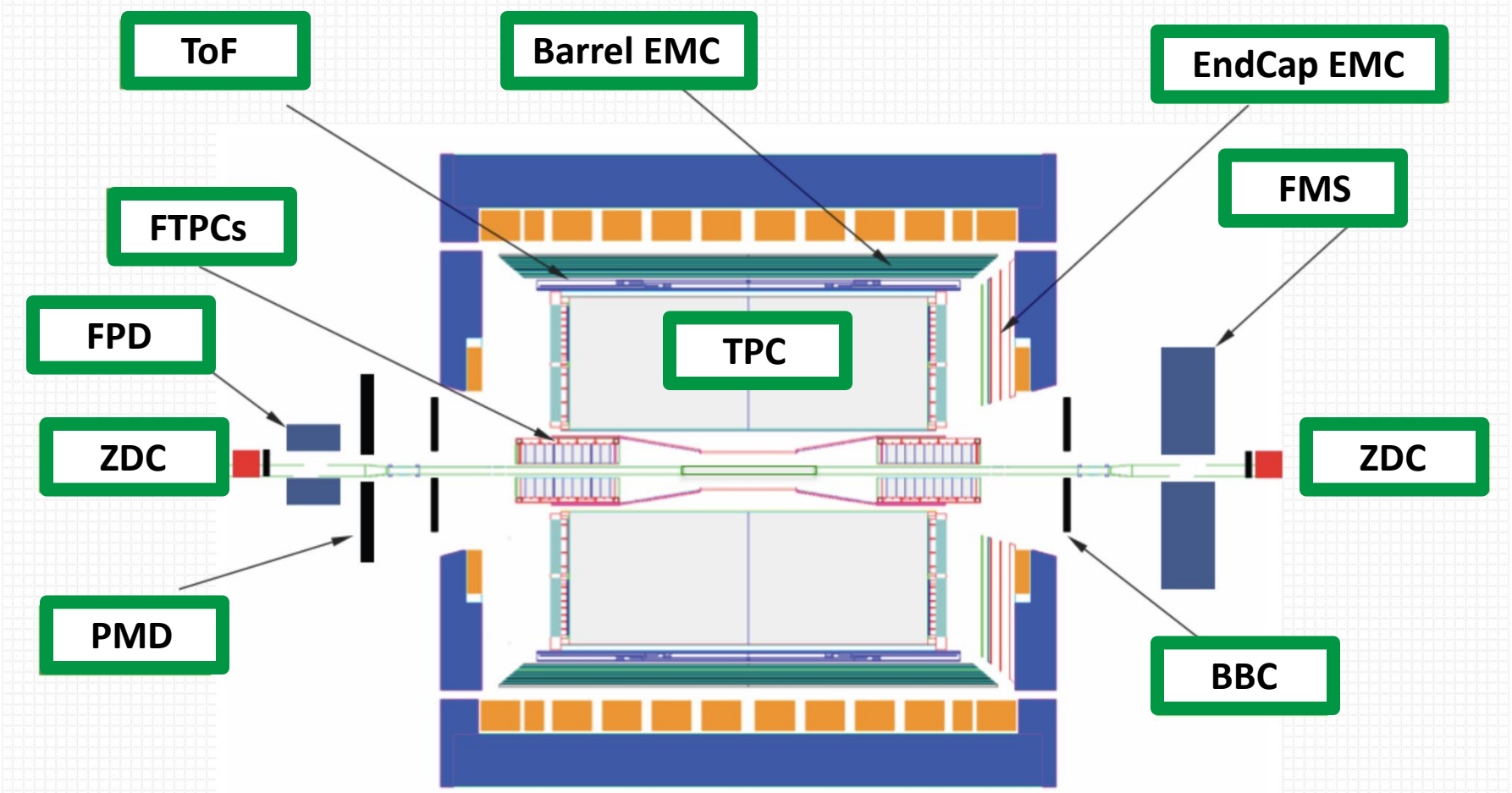
for the STAR Collaboration

STAR Physics Goals for Run 11

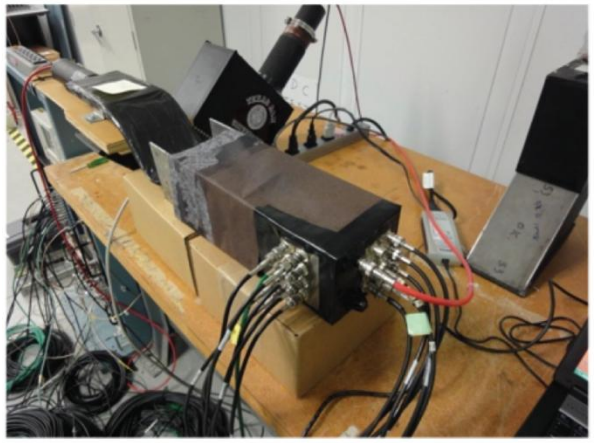
- Spin Physics (p+p @ 500 GeV 10 Weeks)
  - Longitudinal (L = 80 pb^{-1} P^2L = 20 pb^{-1})
    - W A_L at mid-rapidity
    - Δg from Jets/Di-Jets
    - DPE and Hadronic Spin-Flip Amplitude
  - Transverse (P^2L = 4 pb^{-1})
    - π, η, Jet A_N vs x_F and p_T
- Heavy Ion Physics (Au+Au, U+U)

Detector Configuration for Run 11

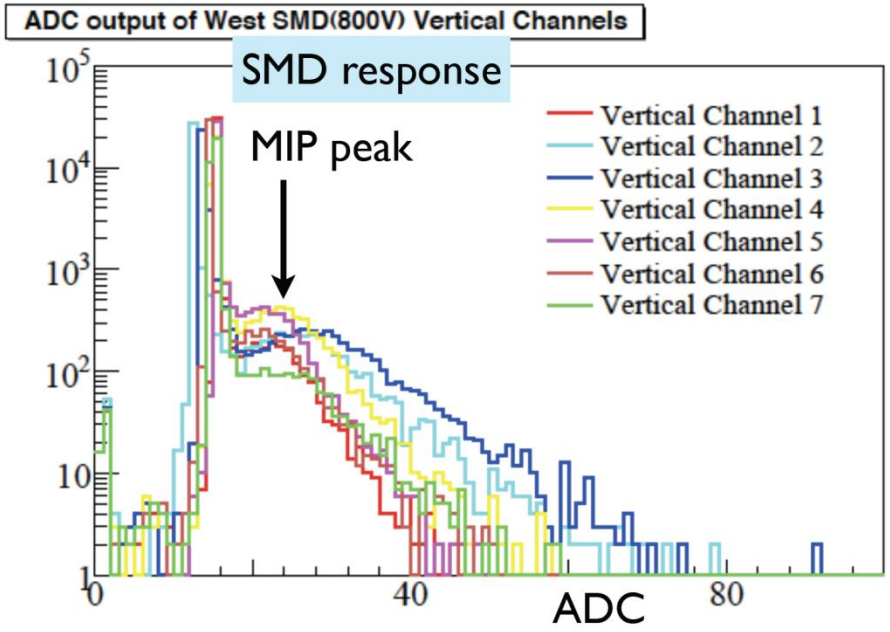


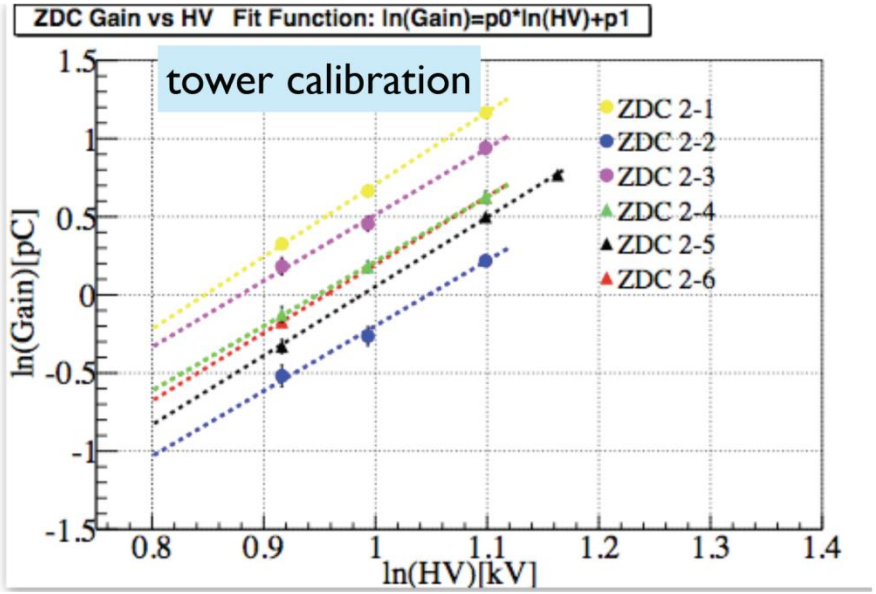
Some extras: Muon Telescope, Test of GEM Prototype, W-powder SPACAL prototype…

New ZDC SMD polarimetry

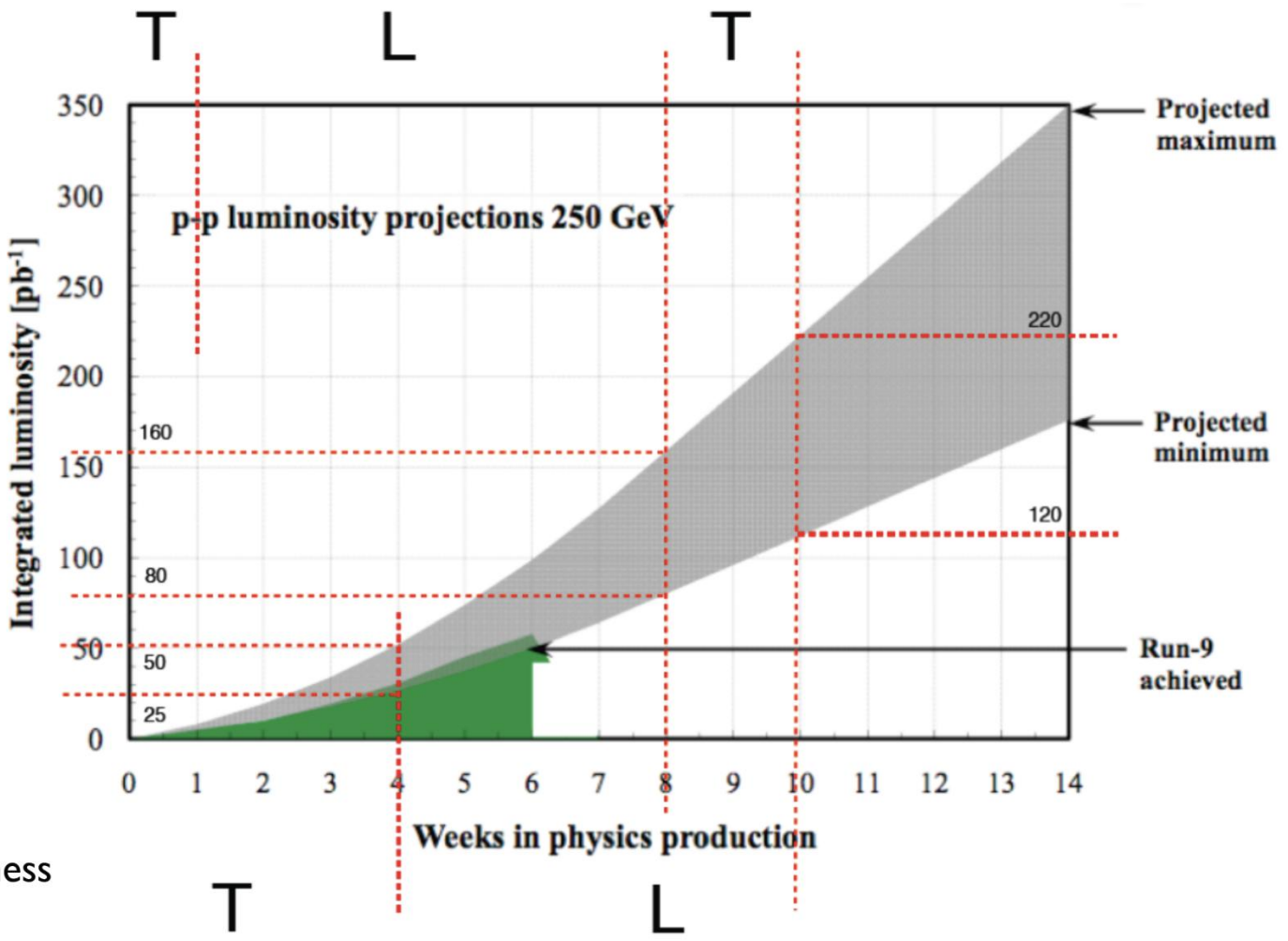


- **Purpose:**
  - Improve relative luminosity for jet A_{LL}
  - Study large A_N at forward angles
- **Setup:**
  - 6 modules from Brahms and 2 existing STAR modules
- **Status:**
  - Cosmic test performed
  - Installed
  - Rest of system unchanged





STAR Run Plan: 1-7-2 or 4-6?



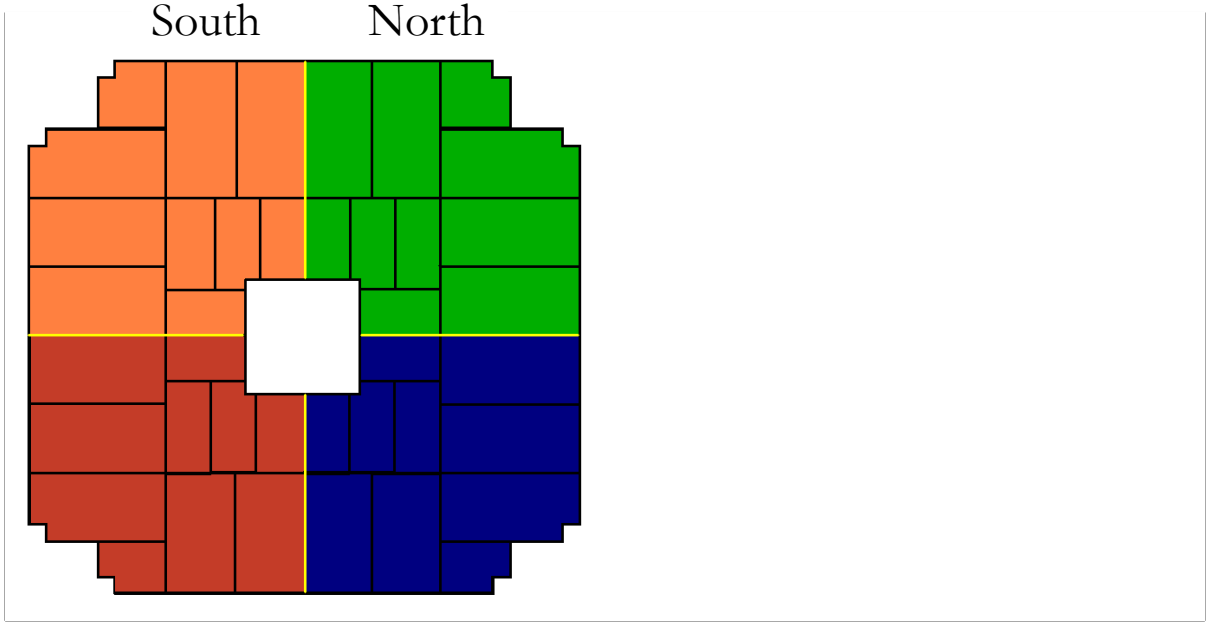
Criteria
* FMS trigger readiness
* is P large enough

Transverse Spin: **$L^*p^2=4$ pb^{-1}**
FMS , π^0 and jets
First 4 weeks

Long. Spin: **$L^*p^2 = 20$ pb^{-1}**
$W^{\pm}$, jets at midrapidity
last 6 weeks

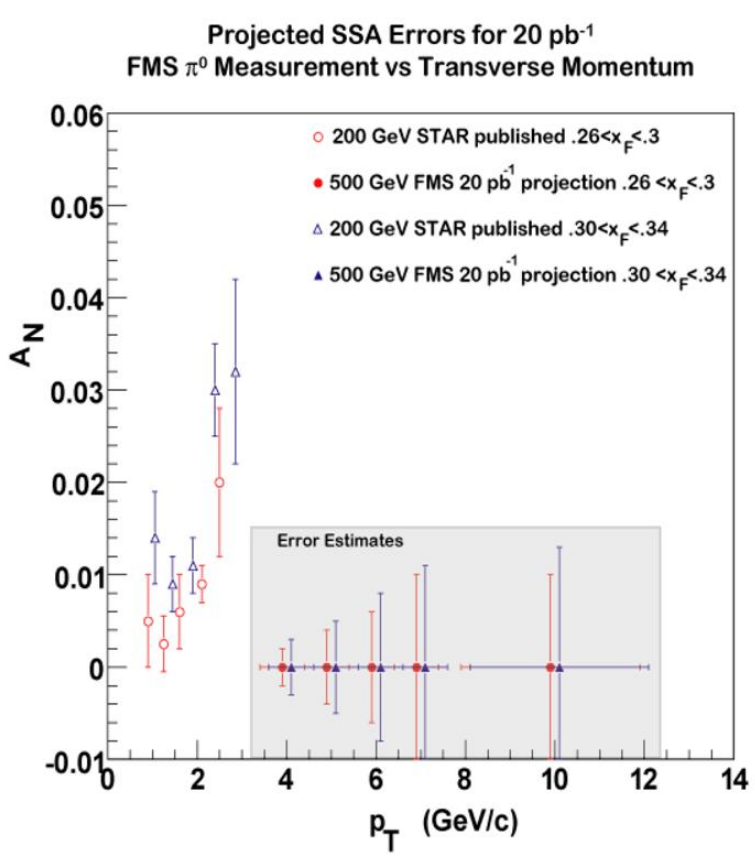
$\Rightarrow L^*p^4=4$ pb^{-1}

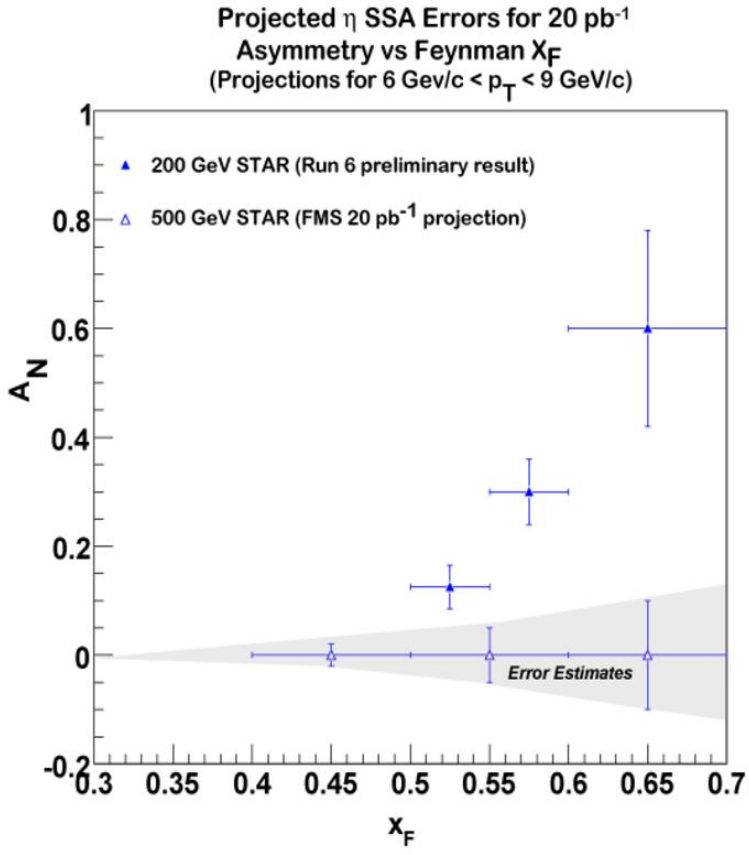
FMS Jet Patch/Cluster Trigger



- Four fixed jet patches (JP), each covering ~90^0 in azimuth
  - Maximize the efficiency for the rare, highest energy events
- Board sum (BSum) triggers
  - Approximate capabilities of the current cluster trigger
  - Provide efficiency for "inclusive … meson" measurements at lower energies where the JP trigger rates would be too high
- High tower triggers
  - For calibration and diagnostics
- Possible di-jet and J/ψ trigger (two non-adjacent JP0 patches)

FMS Run 11 Projections: 20 pb^{-1}





Dijet Correlation Measurements

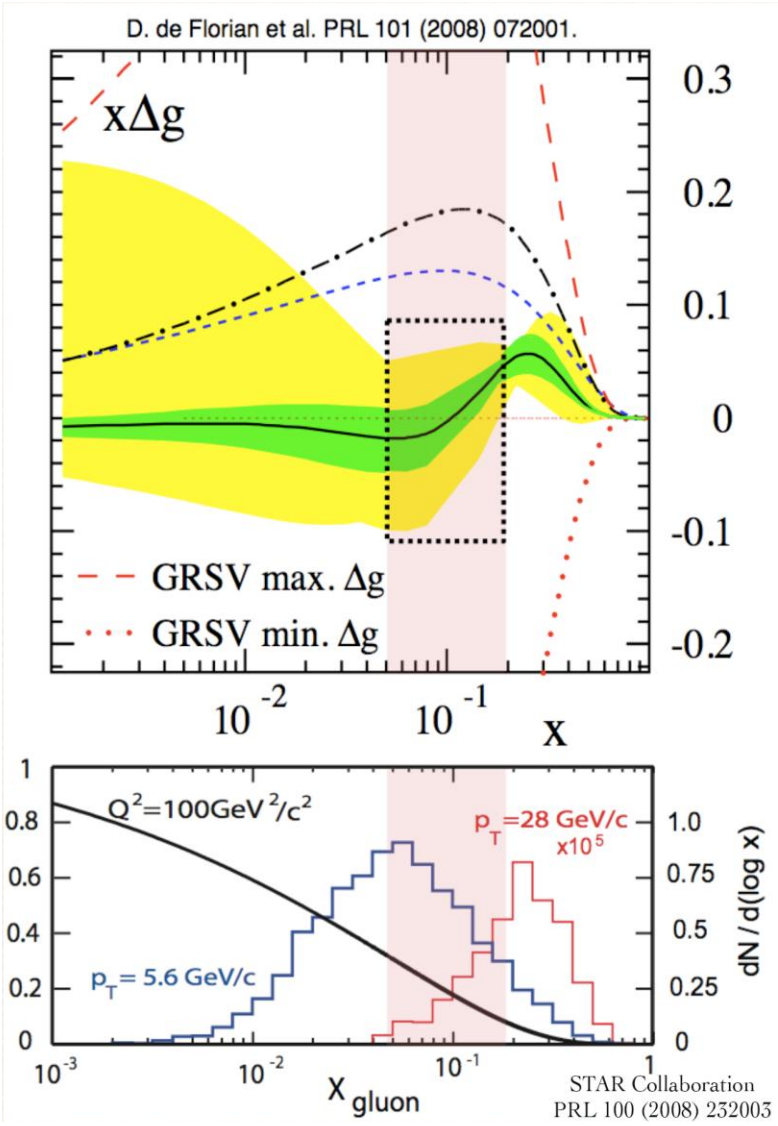
- **Reconstructing multiple physics objects (di-jets, photon-jet) provides information about initial parton kinematics**
- **STAR well-suited for correlation measurements due to large acceptance**

$$x_1 = \frac{1}{\sqrt{s}}(p_{T3}e^{\eta_3} + p_{T4}e^{\eta_4})$$

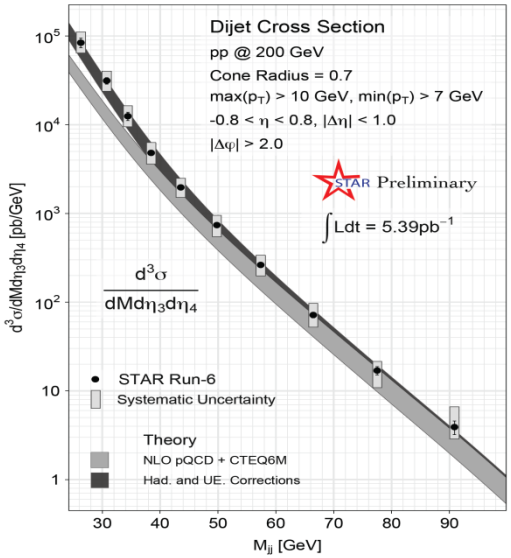
$$x_2 = \frac{1}{\sqrt{s}}(p_{T3}e^{-\eta_3} + p_{T4}e^{-\eta_4})$$

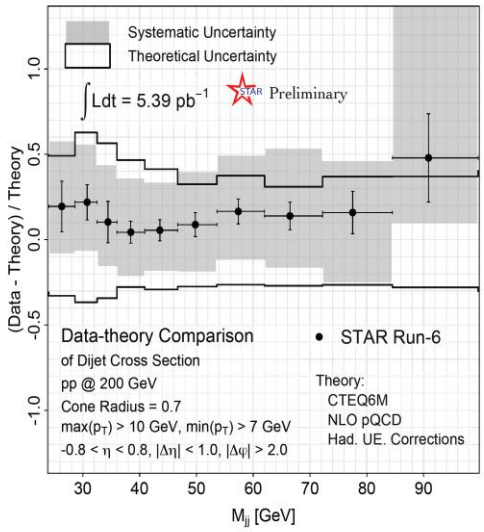
$$M = \sqrt{x_1 x_2 s}$$

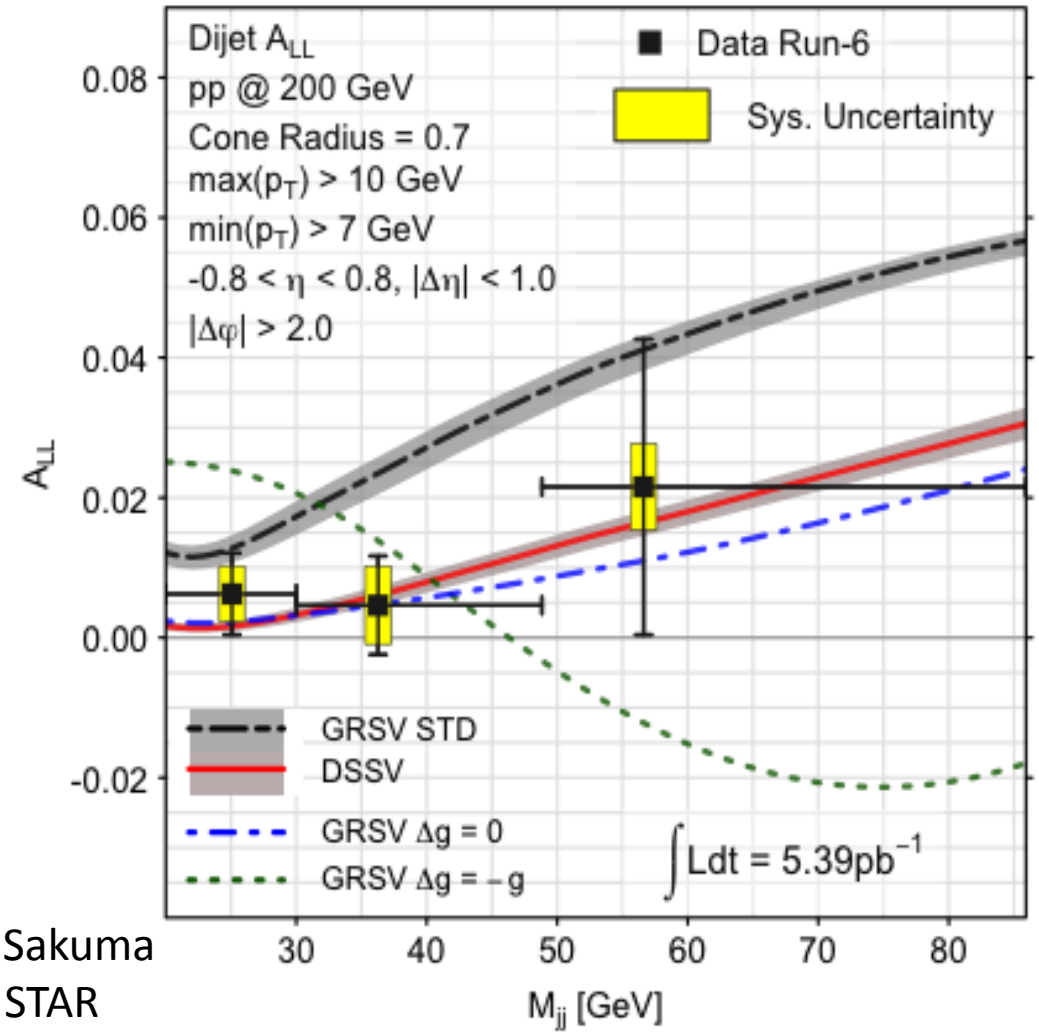
$$\eta_3 + \eta_4 = \ln\frac{x_1}{x_2}$$



Dijet Cross Section and Asymmetry







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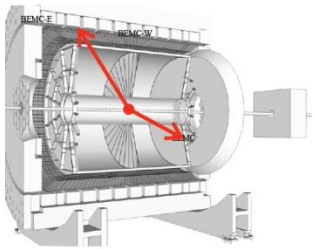
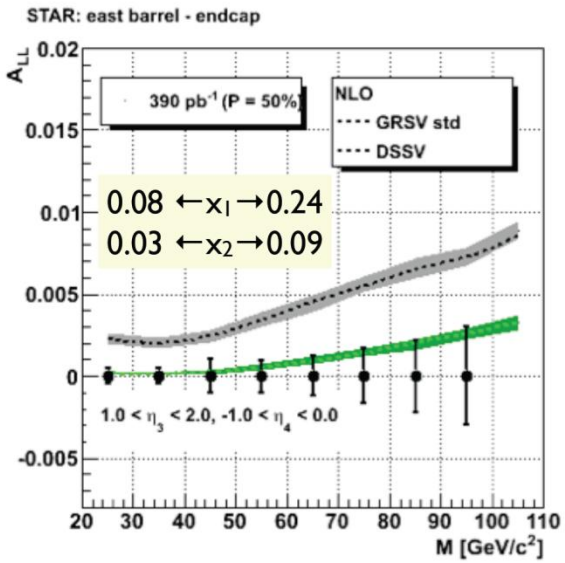
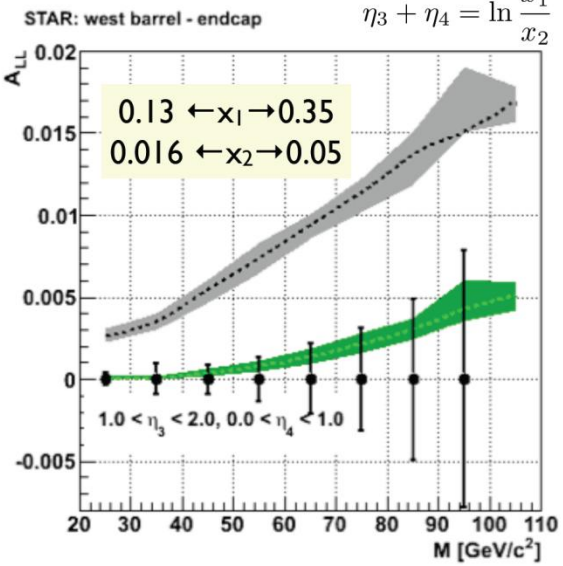
Di-Jet A_{LL} Projections

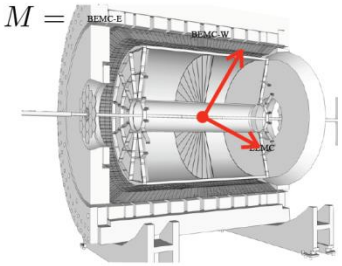
Shown LP^4 = 24/pb
In Run 11 expected ~5/pb

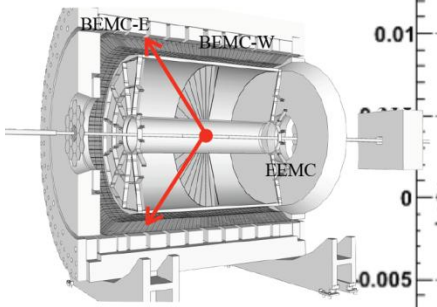


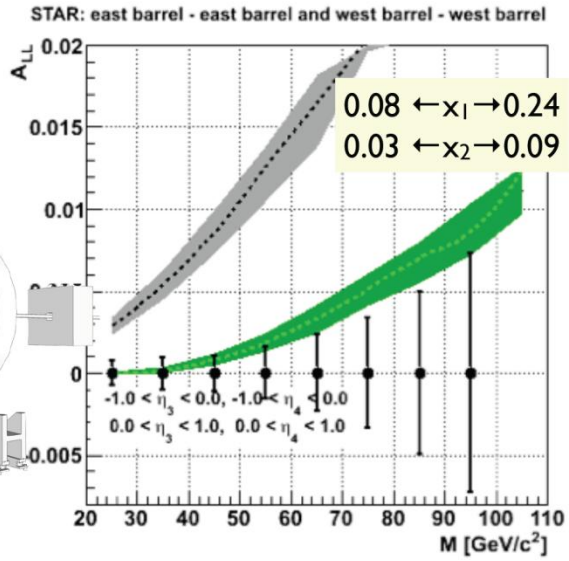


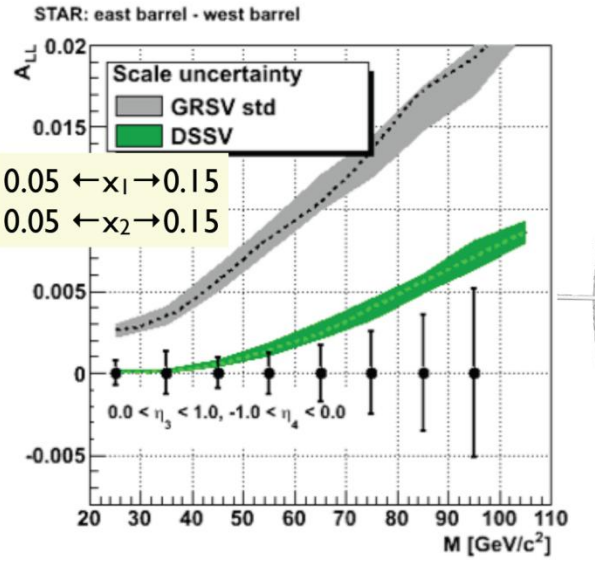


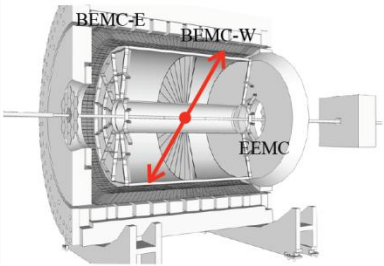
$$\eta_3 + \eta_4 = \ln \frac{x_1}{x_2} \qquad M =$$



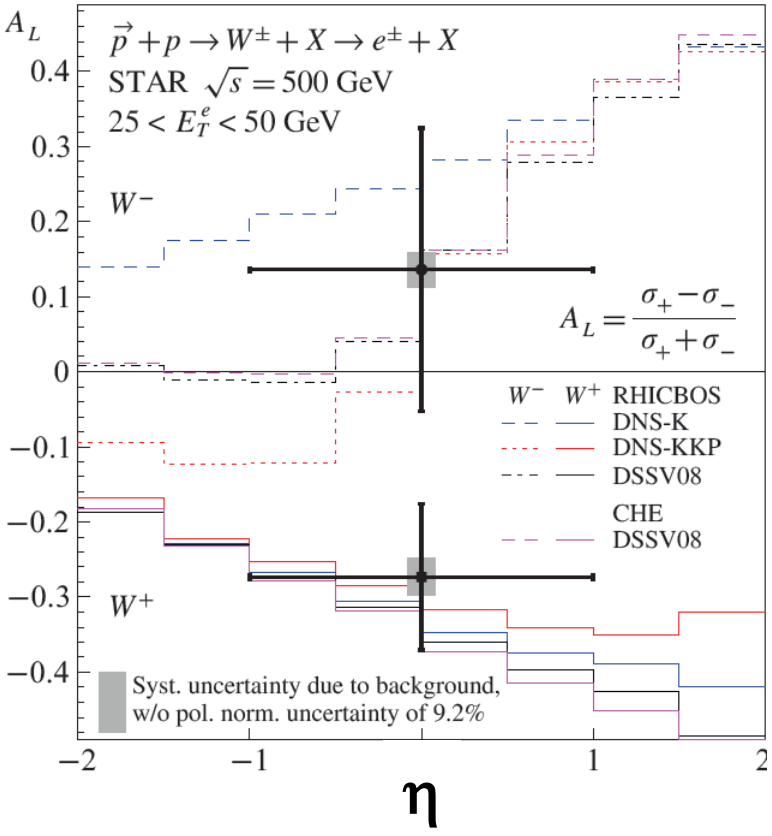




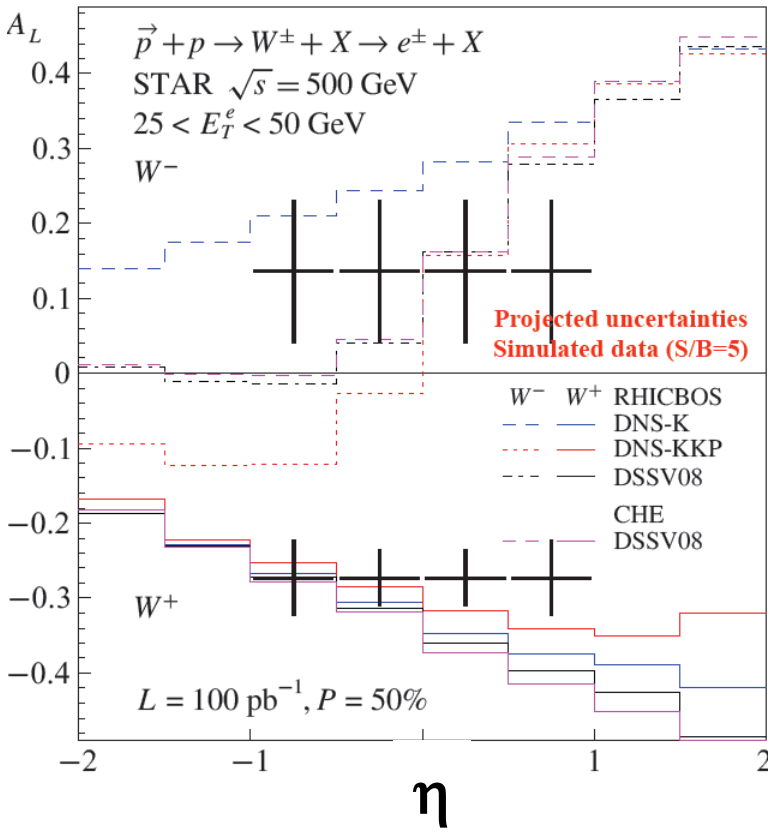




Single Spin Asymmetries for Ws



2009 ($LP^2 = 1.8$ pb^{-1})



($LP^2 = 25$ pb^{-1})

Summary: Plans Unchanged since Last Update

- STAR plans for 10 weeks of polarized pp
- Transverse/Longitudinal ~ 4/6 or 1/7/2
- Improved ZDC luminosity monitoring/polarimetry
- W Asymmetries for antiquark spin pdfs
- Jets/Dijets for gluon $\Delta G/ \Delta g(x)$
- Forward Physics: Sivers/Collins - Quark Orbital Angular Momentum