Control System Issues and Planning for eRHIC

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eRHIC: An Ultra-High-Resolution Electron Femtoscope

Richard Feynman: “Scattering protons on protons is like colliding Swiss watches to find out how they are built”

- $Q^2 =$ invariant mass of the photon
- $x =$ fraction of Proton’s longitudinal momentum carried by the struck quark
- Proton mass = 938 MeV/c$^2$
- Each up/down quarks mass $\sim$ 3 to 5 MeV/c$^2$
- 99% of all visible matter is generated by gluon self-interactions
- quarks only make up 1% of visible mass in the universe.
- Where is missing proton spin?
- Do gluon densities saturate? (Where is onset of gluon saturation?)
**eRHIC in RHIC tunnel**

- **Luminosity**: $10^{33} - 10^{34}$ cm$^{-2}$ s$^{-1}$
- **Electron energy**: 5 - 10 GeV
- **Electron current**: 50 mA
- **Electron polarization**: 80%
- **Proton energy**: 50 - 250 GeV
- **Proton current**: 300 mA
- **Proton polarization**: 70%
- **Center-of-mass energy**: 30 - 70 GeV
Come talk to us!

- Let’s talk about eRHIC and why?
- Learn about RHIC Controls
- Let’s discuss the Evolution of RHIC Controls since 1st commissioned and innovations that have led to amazing performance improvements in the past few years.
- What can our industrial partners do to help?
- Would you like to collaborate?

Thank you!!