

Abstract Submitted
for the HAW05 Meeting of
The American Physical Society

**A New Experiment to Study Transverse Proton Spin Structure
through the Drell-Yan Process in Polarized Proton Collisions at RHIC**

HYE RYONG KIM, University of Illinois at Urbana-Champaign, PHENIX COLLABORATION — Over the past 30 years, significant progress has been made in understanding longitudinal proton spin structure through polarized deep inelastic scattering experiments at SLAC, CERN, DESY, and Jefferson Laboratory. In contrast, the helicity flip transversity distributions of quarks inside a transversely polarized proton are completely unknown. Novel accelerator techniques developed at the Relativistic Heavy Ion Collider (RHIC) at Brookhaven National Laboratory make it possible to study transversity through the Drell-Yan process in high energy polarized proton-proton collisions. An initial study by Vogelsang et al. showed that measurement of spin asymmetries in Drell-Yan at RHIC will only have poor statistical resolution. Based on simulation studies using the event generator PYTHIA, we will demonstrate that the RHIC luminosity upgrade with electron cooling and special focusing magnets (RHIC II) in combination with a new large acceptance calorimeter will lead to precise measurement of transverse single and double spin asymmetries, and thus the transversity quark distributions.

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Date submitted: 01 Jul 2005

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