Abstract Submitted
for the DNP15 Meeting of
The American Physical Society

Direct Photon Production and Gluon Polarization Measurements in Proton-Proton Collisions at PHENIX NILS FEEGE, Stony Brook University, PHENIX COLLABORATION — Direct photons probe the hard scattering process in proton-proton collisions. The channel that dominates their production in these collisions is "the inverse QCD Compton effect," $g+q \rightarrow \gamma+q$. Calculating this process requires no photon fragmentation function, which facilitates comparisons between theories and experiments. In *polarized* p+p collisions, direct photons help determine the proton spin structure. At leading order, the longitudinal double-spin asymmetry A_{LL} is directly proportional to the product of quark and gluon polarizations. The polarized quark distributions are known from polarized lepton-proton scattering experiments. Using them together with A_{LL} measurements allows to access both the magnitude and sign of the polarized gluon distribution. The PHENIX experiment has collected data from polarized p+p collisions at RHIC at center of mass energies of 200 GeV and 500 GeV. This talk presents the status of direct photon cross section measurements and A_{LL} measurements at midrapidity ($|\eta| < 0.35$) using these data.

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Date submitted: 09 Jul 2015 Electronic form version 1.4