Prompt Photon Measurements with the PHENIX MPC-EX Detector

JOHN LAJOIE, Iowa State University, for the PHENIX Collaboration —
The MPC-EX detector is a Si-W preshower extension to the existing PHENIX Muon Piston Calorimeter (MPC). The MPC-EX consists of eight layers of alternating W absorber and Si mini-pad sensors. Covering a large pseudorapidity range, $3.1 < |\eta| < 3.8$, the MPC-EX and MPC access low-x partons in the Au nucleus in d+Au collisions through prompt photon measurements. With the addition of the MPC-EX, the neutral pion reconstruction range extends to energies > 80 GeV, a factor of four improvement over current capabilities. Not only will the MPC-EX strengthen PHENIX’s existing forward $\pi^0$ and jet measurements, it also provides the necessary $\pi^0$ rejection to make a prompt photon measurement feasible. With this $\pi^0$ rejection, prompt photon yields at high $p_T$, $p_T > 3$ GeV, can be statistically extracted using a double ratio method. The prompt photon $R_{dAu}$ measured with the MPC-EX will quantify the level of gluon shadowing or saturation in the Au nucleus at low-x, $x \sim 10^{-3}$, with a projected systematic error band a factor of four smaller than current global fits to current measurements.

John Lajoie
Iowa State University

Date submitted: 06 Jul 2012

Electronic form version 1.4