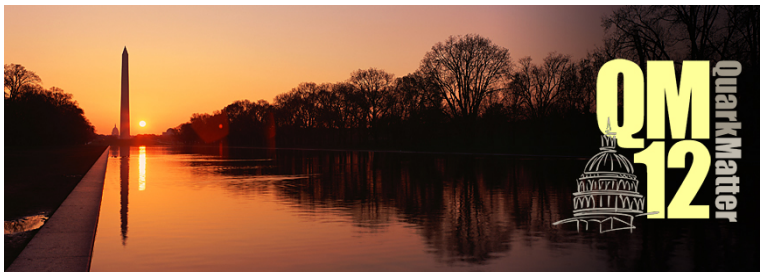

Contribution ID: **346** Type: **Poster**

Direct photon capabilities of the proposed MPC-EX detector at PHENIX

Thursday, August 16, 2012 4:00 PM (2 hours)

The proposed MPC-EX detector is a Si-W preshower extension to PHENIX's existing Muon Piston Calorimeter (MPC). The MPC-EX consists of eight layers of alternating W absorber and Si mini-pad sensors. Located at large rapidities, 3.1 < $|\eta|$ < 3.8, the MPC-EX and MPC access low-x partons in the Au nucleus in d+Au collisions. 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 π^0 and jet measurements, it also provides the necessary π^0 rejection to make a direct photon measurement feasible. With this π^0 rejection, direct photon yields at high p_T, p_T > 3 GeV, can be statistically extracted using a double ratio method. The direct 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 ˜ 10ˆ-3, with a projected systematic error band a factor of four smaller than EPS09's current allowable range. Direct photons at forward rapidities are optimally sensitive to the gluon distribution because, unlike pions, direct photons are only produced by processes that are directly sensitive to the gluon distribution at leading order. A measurement of the forward direct photon R_{dA} will cleanly access and greatly expand our understanding of the gluon nuclear parton distribution functions and provide important information about the initial state in heavy ion collisions.

Primary author: CAMPBELL, Sarah (I)

Presenter: CAMPBELL, Sarah (I)

Session Classification: Poster Session Reception

Track Classification: Experiment upgrades, new facilities, and instrumentation