

Abstract Submitted  
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**Measurement of direct photons with a new  $\pi^0$  tagging method in  $\sqrt{s_{NN}} = 200\text{GeV}$  AuAu Collision at PHENIX** HAIJIANG GONG, State Univ. of New York at Stony Brook, PHENIX COLLABORATION — Direct photons provide an excellent probe to study the different stages of a heavy ion collision, especially the formation of a quark-gluon plasma(QGP), without being influenced by the strong interaction and hadronization processes. In the  $p_T$  range of 1-3GeV/c thermal photons are expected to be the dominant source of direct photons and carry information about initial temperature of QGP. The yield of direct photons can be determined based on the inclusive photon yield and the background from hadronic decays. But due to the huge hadronic background at low  $p_T$ , the measurement is very challenging. A new method to determine direct photon excess yield above the background from decay photons is presented, which should lead to smaller systematic errors at low  $p_T$ . It uses strict photon identification in the EMCAL and a charged particle veto to extract a clean photon signal. The clean photons are then tagged with EMCAL photon candidates, which can be reconstructed with high efficiency, to determine the fraction of photons originating from  $\pi^0$  decays. Many systematic uncertainties and detector effects cancel in this method. The result of this analysis and comparison with several other thermal photons measurements at PHENIX will be presented.

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