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Low p_T direct photon production at RHIC measured with PHENIX

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PHENIX has used the versatility of RHIC to map out low p_T direct photon production as function of collision system size and beam energy. For systems with a size corresponding to a $dN_{ch}/d\eta$ larger than 20-30, we observe a large yield of direct photons, a large azimuthal anisoptropy with respect to the reaction plane, and a characteristic centrality dependence of $dN_\gamma/dy \propto (dN_{ch}/dy)^\alpha$, with $\alpha \sim 1.2$.
In this talk, we will present new results from Au+Au and Cu+Au collisions at $\sqrt{s_{NN}}$ = 200˜GeV. After subtracting the prompt photon component, the inverse slope for the p_T range from 1-2˜GeV/c is 250˜MeV, but increases to about 400˜MeV for the range from 2 to 4˜GeV/c. Within the experimental uncertainty, there is no indication of a system size dependence of the inverse slope. Furthermore, the system size dependence of the yield, expressed through the power α, remains independent of p_T over the entire observed range from 1 to 6˜GeV/c. Like the large yield and azimuthal anisotropy, these features, while qualitative consistent with the emission of thermal photons from the quark gluon plasma, elude a quantitative description through theoretical model calculations.

Authors: DAVID, Gabor; ESHA, Roli (Center for Frontiers in Nuclear Science, Stony Brook University)

Presenter: ESHA, Roli (Center for Frontiers in Nuclear Science, Stony Brook University)

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