Friday, August 7th
11:00 AM Session

Hard and Thermal Photon Absorption in a Quark-Gluon Plasma

E. Palmerduca[1,2], and R. Fries[2]

[1] Colgate University, Hamilton, NY 13346
[2] Cyclotron Institute, Texas A&M University, College Station, TX 77843

The direct photon spectrum in nuclear collisions is of interest as it holds information such as the temperature of the quark-gluon plasma (QGP) and of the hot hadron gas (HG) created. Re-interactions between emitted photons and the medium are often omitted in calculations due to the assumption that these photons' mean free path is significantly longer than the spatial dimensions of the fireball. This study tests the validity of this assumption by modeling hard and thermal photon reabsorption in a rapidly expanding and cooling fireball. Thermal photon production rates, calculated using complete leading order perturbative quantum chromodynamics (pQCD) for QGP and state-of-the-art rates for HG, are used to compute absorption rates of hard and thermal photons. The hot fireball of QGP and HG is simulated by ideal hydrodynamics. The spectrum and elliptic flow of these photons are calculated and compared both to p-p collisions and to data from ultrarelativistic heavy-ion collisions (URHIC) at the Relativistic Heavy Ion Collider (RHIC) and the Large Hadron Collider (LHC).