Photons from Pb-Pb Collisions at CERN SPS

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Abstract

We have performed a detailed study of photon emission from matter created in Pb + Pb collisions at CERN SPS energies. The evolution of matter from the initial state up to freeze-out has been treated within the framework of (3+1) dimensional hydrodynamic expansion. The effects of the spectral changes of hadrons with temperature on the photon emission rate and on the equation of state have been incorporated. We observe that the photon spectra measured by the WA98 experiment are well reproduced with hard QCD photons and photons from a thermal source with initial temperature ~ 200 MeV. The thermal contribution has been evaluated in different evolution scenarios both with and without QGP in the initial state. We find that either substantial medium modification of hadronic masses or a deconfined initial state is necessary to reproduce the data. Photon yield for Au + Au collisions at RHIC energies is also estimated.