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Recent photon physics results from the ALICE experiment at LHC

Depending on their energy and their production mechanism, photons probe different properties of strongly interacting matter produced in heavy ions collisions. Neutral meson spectra, reconstructed via their two-photon decays, are considered to be sensitive to the medium transport. In addition to that, direct photons can be used to perform a tomography of the initial states of the collision. At high p_T direct photons can provide invaluable information on the medium interaction with quarks through gamma-hadron (jet) correlations. At low pT direct photons can give important information on the medium conditions, such as its temperature and anisotropic flow.

The ALICE experiment at the LHC reconstructs photons by using the two electromagnetic calorimeters (photon spectrometer, sampling calorimeter) and central tracking systems for photon converted e+e- pairs in the material of the inner ALICE detectors. Transverse momentum spectra of π0 and direct photons at mid-rapidity in pp and Pb-Pb collisions have been measured at LHC energies by the ALICE detector. Parton fragmentation has been estimated from gamma-hadron correlations in pp collisions to be used as a baseline for further Pb-Pb analysis.

We present an overview of the analysis of all the above mentioned photon measurements. Neutral pion spectra measured in pp collisions at 0.9, 2.76 and 7 TeV allow better tuning for pQCD calculations. In Pb-Pb collisions the direct photon spectrum underpredicts the data below 4 GeV/c where it is expected to have a contribution from thermal radiations. The nuclear modification factor R_{AA} of the π0 production at different collision centralities shows a clear pattern of strong suppression in a hot QCD medium with respect to pp collisions. Finally, parton fragmentation following hard collisions are investigated by correlating high momentum direct photons and charged hadrons with the goal of revealing new insights into medium effects in the QGP.

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