



Contribution ID: 152

Type: **Contributed Talk**

Direct-photon spectra and flow in Pb-Pb collisions at the LHC measured with the ALICE experiment

Monday, 19 May 2014 15:00 (20 minutes)

Unlike hadrons, direct photons are produced in all stages of a nucleus-nucleus collision and therefore test our understanding of the space-time evolution of the produced medium. Of particular interest are

so-called thermal photons expected to be produced in a quark-gluon plasma and the subsequent hadron gas.

The transverse momentum spectrum of thermal photons carries information about the temperature of the emitting medium. The effect of Doppler blueshift on photons spectra from later and colder stages of a collision, however, potentially complicates the extraction of the temperature.

In this presentation, direct-photon spectra in the range $1 < p_T < 12$ GeV/c from Pb-Pb collisions at

$\sqrt{s_{NN}} = 2.76$ TeV will be shown. The results were obtained with two independent methods:

by measuring photons with the electromagnetic calorimeter PHOS and by measuring e^+e^- pairs from

external conversions of photons in the detector material. The measured direct-photon spectra will be compared with predictions from

state-of-the-art hydrodynamic models. In addition, direct-photon production

in p-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV will be discussed. In the standard hydrodynamical modeling of nucleus-nucleus

collisions, thermal photons mostly come from the early hot stage of the

collision. As collective hydrodynamic flow needs time to build up, the azimuthal anisotropy of

thermal photons quantified with Fourier

coefficient v_2 is expected to be smaller than the one for

hadrons. However, the PHENIX experiment and ALICE experiment observed v_2 values of direct-photons

similar in magnitude to the pion

v_2 . These unexpected observations constitute the so called

“direct-photon flow puzzle” as they challenge the standard hydrodynamic picture of nucleus-nucleus

collisions and/or the standard

photon emissions rates in the quark-gluon plasma and the hadron gas.

We will present the inclusive photon v_2 and v_3 in Pb-Pb

collisions at $\sqrt{s_{NN}} = 2.76$
TeV in the range $1 < p_T < 5$
GeV/c and discuss implications for the v_2 and v_3 of
direct-photons.

On behalf of collaboration:

ALICE

Primary author: BOCK, Friederike (Ruprecht-Karls-Universitaet Heidelberg (DE))

Presenter: BOCK, Friederike (Ruprecht-Karls-Universitaet Heidelberg (DE))

Session Classification: Electromagnetic probes

Track Classification: Electromagnetic Probes