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Measurement of high p_T photons and neutral mesons in pp and Pb-Pb collisions at mid-rapidity with ALICE

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The ALICE experiment at the LHC performs measurements of neutral meson and direct photon inclusive spectra at mid-rapidity in a wide p_T range in pp , p -Pb and Pb-Pb collisions. Photons and neutral mesons (π^0 , η , ω) are reconstructed via complementary methods, using the ALICE electromagnetic calorimeters, PHOS and EMCal, and by the central tracking system, identifying photons converted into e^+e^- pairs in the material of the inner barrel detectors (TPC and ITS). Prompt direct photons produced in Compton ($q + g \rightarrow \gamma + q$) and annihilation ($q + \bar{q} \rightarrow \gamma + g$) processes can be identified in the EMCal calorimeter combining two techniques: electromagnetic shower shape analysis; and isolation cut analysis (no other particle production along the photon direction in the hard process), making use of the measured particle activity in the EMCal and in reconstructed tracks close to the prompt photon candidate. These methods are efficient in getting rid of photons from neutral meson decays (π^0 and η), dominant at high-energy collisions produced at LHC.

Measurements of isolated photons and neutral meson spectra in pp collisions provide valuable data for pQCD calculations and allow us to study scaling properties of hadron production at LHC energies and to constrain the proton parton distribution function. ALICE measured the nuclear modification factor R_{AA} for the π^0 production in Pb-Pb collisions at $\sqrt{s_{NN}}=2.76$ TeV at different collision centralities showing a clear pattern of strong suppression in a hot QCD medium with respect to pp collisions.

In this presentation, we will show π^0 and η spectra in pp and Pb-Pb collisions and isolated photon spectra in pp collisions up to high p_T . These results will be compared to state-of-the art theoretical predictions.

On behalf of collaboration:

ALICE

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