



Contribution ID: 473

Type: **Parallel Talk**

Low mass dielectron measurements in pp, p-Pb, and Pb-Pb collisions with ALICE at the LHC

Thursday, July 6, 2017 12:15 PM (15 minutes)

Low mass dielectron measurements in ultra-relativistic heavy-ion collisions bring an important information on the properties of the hot and dense QCD medium and whole space-time evolution of the medium created in heavy-ion collisions.

Dielectrons in the mass range below $1 \text{ GeV}/c^2$, are from ordinary Dalitz and resonance decays of pseudoscalar and vector mesons. Dielectron invariant mass from short-lived vector mesons is sensitive to medium modifications of the spectral functions that are related to the chiral symmetry restoration at high temperatures. Dielectrons in the intermediate mass region from 1 to $3 \text{ GeV}/c^2$ originate mainly from the correlated electron pairs from semi-leptonic decays of charm and beauty quarks, which carry the information on the heavy-quark energy loss. Thermal radiations from the medium contribute to the dielectron yields in a broad mass range and provide information on the thermodynamical properties of the medium.

Low mass dielectrons have been measured with the ALICE detector at the LHC in pp collisions at $\sqrt{s} = 7 \text{ TeV}$ and p-Pb collisions at $\sqrt{s_{NN}} = 5.02 \text{ TeV}$ to study and disentangle effects due to the cold nuclear matter. In Pb-Pb collisions, the low mass dielectron mass spectra are measured for different pair p_T ranges.

In this talk, we will present a review of LHC Run-1 results from pp, p-Pb, and Pb-Pb collisions and we will discuss the production of virtual photons and heavy quarks. Furthermore, we will discuss the latest results of the analysis of Run-2 pp collisions at 13 TeV and report on the development of our analysis employing multivariable analysis techniques.

Experimental Collaboration

ALICE Collaboration

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Session Classification: Heavy ion physics

Track Classification: Heavy Ion Physics