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

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Measurements on dielectrons (electron-positron pairs) produced in ultra-relativistic heavy-ion collisions (HIC) allow the study of the electromagnetic radiation that is emitted through the whole evolution of the system and that is not affected by final state interactions. Through the study of dielectrons at midrapidity one can investigate different phenomena by taking advantage of the degree of freedom given by the dielectron invariant mass. Low-mass dielectrons deliver information on the temperature of the system at its different stages, the in-medium modification of the spectral function of the rho meson, the modifications on the production of open heavy-flavour pairs, and the production of direct photons at low transverse momentum (p_T) accessing the virtual quasi-real photon production.

In proton-proton collisions, dielectrons are used to establish a vacuum baseline for the study of HIC and to obtain heavy-flavour cross sections of open charm and beauty production in a method sensitive to the correlation of the initial quark pairs, and to measure the direct photon production at low p_T that can be compared with perturbative QCD calculations.

Proton-nucleus collisions are investigated in order to disentangle hot from cold-nuclear matter effects.

In this talk we report the results of the ALICE measurements in three collision systems: Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ and 5.02 TeV, pp collisions at $\sqrt{s} = 7$ TeV and 13 TeV, and p-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV. Results from high-multiplicity pp collisions at $\sqrt{s} = 13$ TeV are reported as well.

The effects on the obtained dielectron spectra of a reduced magnetic field configuration and multivariate analyses with machine learning are also shown.

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