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Low-mass di-lepton measurements in Pb–Pb collisions with ALICE at the LHC

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The production of low-mass dielectrons is one of the most promising tools for the understanding of the chiral symmetry restoration and of the thermodynamical properties of the Quark-Gluon plasma (QGP) created in ultra-relativistic heavy-ion collisions. At low invariant mass ($m_{ee} < 1.1$ GeV/c^2), the dielectron invariant-mass spectrum is sensitive to the properties of short-lived vector mesons in the medium and modifications related to the chiral symmetry restoration. Thermal radiation emitted by the system, both during the partonic and hadronic phase, contributes to the dielectron yield over a broad mass range and gives insight into the temperature of the medium. In the intermediate-mass region ($1.1 < m_{ee} < 2.8$ GeV/c^2), the measurement of thermal dielectrons from the QGP is very challenging at the LHC due to the dominant contribution of correlated e^+e^- pairs from semileptonic decays of charm and beauty hadrons.

In this talk, we will present the final results of e^+e^- pair production in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 2.76 TeV and the status of the analysis at $\sqrt{s_{NN}}$ = 5.02 TeV. We will discuss the modifications of dielectron yields in Pb–Pb collisions compared to known hadronic sources and the production of virtual photons. Furthermore, runs with a reduced magnetic field of the ALICE solenoid are planned for the Pb–Pb data taking during the LHC Run 3, to improve the signal-to-background ratio, a key aspect of this analysis. It simultaneously gives the opportunity to study very soft dielectron production. We will show results obtained with pilot runs in minimum-bias pp collisions at 13 TeV.

Summary

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