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Thermal radiation from small to large systems via low-mass dielectrons with ALICE

Electromagnetic probes are a unique tool for studying the space-time evolution of the hot and dense matter created in ultra-relativistic heavy-ion collisions. Dielectron pairs are emitted during the entire evolution of the medium created in such collisions, allowing the extraction of the real direct photon fraction at vanishing mass and providing access to thermal radiation from the early hot stages of the collision. The measurement of dielectron and direct photon production in minimum-bias pp collisions serves as a crucial baseline for the studies in heavy-ion collisions, whereas pp collisions with high charged-particle multiplicities allow the search for interesting phenomena such as the possible presence of QGP in small systems.
This talk will present the final LHC Run 2 ALICE results on the direct-photon production in pp and central Pb–Pb collisions using the virtual-photon method. The results from central Pb–Pb collisions at $\sqrt{s_{\rm NN}}$ = 5.02 TeV are compared to theoretical models that include hot medium effects such as thermal radiation and chiral symmetry restoration. Different approaches to disentangle the background from semi-leptonic heavy flavour decays are presented and discussed. To study the possible onset of the formation of a hot medium, we also report the results on the direct-photon production in pp collisions at $\sqrt{s}$ = 13 TeV as a function of charged-particle multiplicity. For the first time at LHC energies we observe a significant yield of direct photons in pp collisions at low $p_{\rm T}$. The results are compared to theoretical models that include a contribution from a thermalised source.

Secondary track

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