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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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The production of low-mass dielectrons is the most promising tool for the understanding of the chiral symmetry restoration and of the properties of the Quark-Gluon Plasma (QGP)
created in heavy-ion collisions. At low invariant mass, the dielectron production is sensitive to the properties of vector mesons in the medium related to the chiral symmetry
restoration. In the intermediate-mass region, the main component of the dielectron continuum is coming from correlated electron pairs from heavy-flavour hadron decays, which carry information about heavy-quark energy loss and collectivity. In this mass region, thermal
radiation from the QGP gives insight into the early temperature of the medium. Finally,
at very low momenta initial photon annihilation and photonuclear processes, triggered by
the coherent electromagnetic fields of the incoming nuclei, are expected to play a role
in more peripheral collisions.

To study the dielectron production in heavy-ion collisions, it is crucial to first understand the primordial e^+e^- pair production in vacuum with minimum-bias proton-proton collisions and to disentangle hot from cold-nuclear matter effects with p–Pb collisions. Moreover, observations of collective effects in high-multiplicity pp and p–Pb collisions show surprising similarities with those in heavy-ion collisions, which can be further investigated with the measurement of dielectrons in such collisions.

In this talk, we will give an overview of the latest measurements of e^+e^-
pair production in pp, p–Pb and Pb–Pb collisions recorded by ALICE at different energies. The results will be shown as a function of the charged-particle multiplicity in the event,
or the centrality of the collision. They will be compared to the expected dielectron yield from known hadronic sources and in Pb-Pb collisions with several predictions for the
thermal radiation from the hadron gas and QGP phases and photo-production of correlated e^+e^-. Their implications for the production of heavy quarks and quasi-real
virtual-photons will be discussed as well.

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