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Dielectron physics opportunities with ALICE 3

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The ALICE 3 experiment is planed as a compact, next-generation multipurpose detector at the LHC as a follow-up to the present ALICE experiment. It will provide unprecedented tracking and vertexing capabilities down to a few tens of MeV/c in pp, pA and AA collisions and will have a large rapidity coverage $|\eta| < 4$. Such detector performances allow to study precisely the dielectron production over a broad range of pair p_{T} and mass. Dilepton production at very low p_{T} and mass is particularly sensitive to the electric conductivity of the medium via thermal dielectrons in heavy-ion (AA) collisions. At higher dielectron invariant masses (m_{ee}), dielectrons from ρ meson decays carry information about chiral-symmetry restoration, e.g. via the chiral mixing between ρ and a_1 mesons. Moreover, the m_{ee} spectrum of thermal dielectrons from the QGP directly provides a mean to estimate the early temperature of the medium in the $1.1 < m_{ee} < 2.7$ GeV/c^2 region, whereas elliptic flow measurement as a function of m_{ee} and pair transverse momentum allow a study of the dynamic in the medium as a function of time. \newline

This poster will give an overview of the performance studies for dielectron analyses with the ALICE 3 experiment aiming at specific criteria to optimise the layout of the detector. A possible way to track and identify electrons will be presented. Furthermore, it will be explained how the combinatoric background can be reduced with a so-called prefilter technique. The capability to reject the correlated heavy-flavour background will be discussed. Finally projections for differential dielectron measurements will be shown.

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