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Dilepton production in transport-based approaches

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Lepton pairs are an excellent probe for matter at high densities and temperatures. In particular they provide a rather direct access to the in-medium self energy of vector mesons, which is believed to be dominated by baryonic effects. We perform transport-based simulations with the GiBUU and UrQMD models to investigate dilepton production in a wide energy range and show that baryonic contributions are particularly important at low energies, where they can show up as Dalitz-like channels already in vacuum, but also generate a sizeable in-medium enhancement. In order to incorporate in-medium contributions, we employ a coarse-graining approach, which makes it possible to couple a realistic transport evolution with sophisticated in-medium spectral functions. In this way we achieve a good description of low-mass dilepton spectra at SIS and SPS energies within one consistent framework. This also paves the way for further investigations connected to the RHIC beam energy scan and the future CBM experiment at FAIR.

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