

Dilepton production in heavy ion collisions at LHC

O. Linnyk,¹ W. Cassing,¹ J. Manninen,^{2,3} E.L. Bratkovskaya,^{2,3} P.B. Gossiaux,⁴

J. Aichelin,⁴ T. Song, and C.M. Ko

¹*Institut für Theoretische Physik, Universität Giessen, DE-35392 Giessen, Germany*

²*Institut für Theoretische Physik, Johann Wolfgang Goethe University, Frankfurt am Main, Germany*

³*Frankfurt Institute for Advanced Studies, DE-60438 Frankfurt am Main, Germany*

⁴*Laboratoire de Physique Subatomique et des Technologies Associees, University of Nantes, 44072 Nantes Cedex 03, France*

We have studied dielectron pair production in proton-proton and central Pb+Pb collisions at $s_N^{1/2} = 2.76$ TeV within two models [1]: an extended statistical hadronization model [2] and the Parton-Hadron-String Dynamics (PHSD) transport approach [3]. We find that the PHSD calculations roughly agree with the dilepton spectrum from hadronic sources with the cocktail estimates from the statistical hadronization model matched to available data at LHC energies. The dynamical simulations within the PHSD show a moderate increase of the low mass dilepton yield essentially due to the in-medium modification of the rho-meson. Furthermore, pronounced traces of the partonic degrees of freedom are found in the PHSD results in the intermediate mass regime. The dilepton production from the strongly interacting quark-gluon plasma (sQGP) exceeds that from the semi-leptonic decays of open charm and bottom mesons. Additionally, we have observed that a transverse momentum cut of 1 GeV/c further suppresses the relative contribution of the heavy meson decays to the dilepton yield, such that the sQGP radiation strongly dominates the spectrum for masses from 1 to 3 GeV, allowing a closer look at the electromagnetic emissivity of the partonic plasma in the early phase of Pb+Pb collisions.

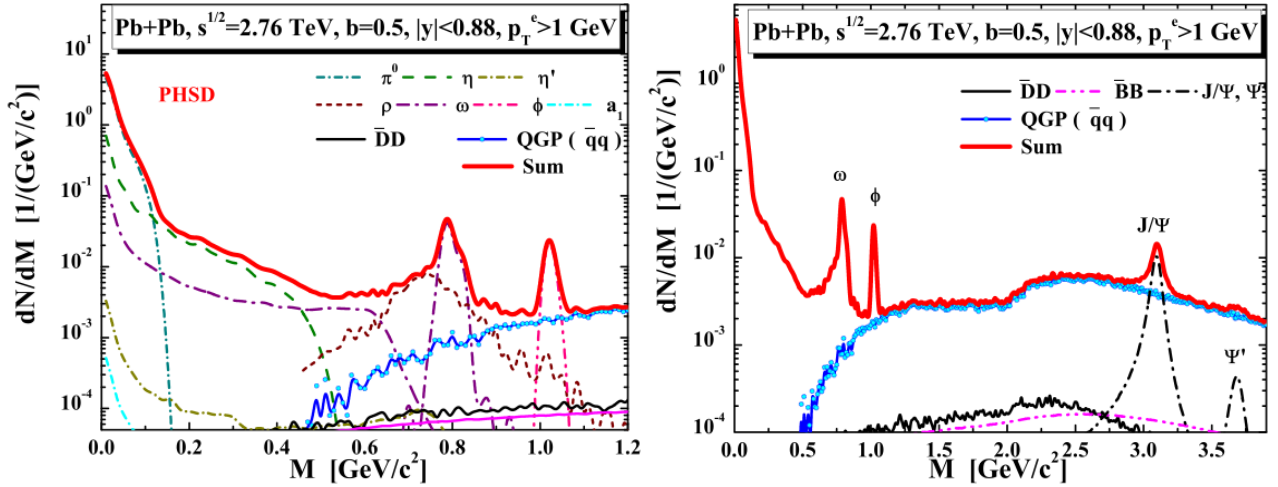


FIG. 1. Left window: Dielectron low invariant mass spectrum from different sources evaluated for the central Pb+Pb collisions at $s_{NN}^{1/2} = 2.76$ TeV within the PHSD approach including vacuum spectral functions for the vector mesons with the transverse momentum cut $p_T > 1$ GeV on the single electron. Right window: Same for dielectron masses up to 4 GeV.

- [1] O. Lynnk, W. Cassing, J. Manninen, E.L. Bratkovskaya, P.B. Gossiaux, J. Aichelin, T. Song, and C.M. Ko, Phys. Rev. C **87**, 014905 (2013).
- [2] J. Manninen, E.L. Bratkovskaya, W. Cassing, and O. Linnyk, Eur. Phys. J. C **71**, 1615 (2011).
- [3] W. Cassing and E. L. Bratkovskaya, Nucl. Phys. **A831**, 215 (2009).