

Probing the QGP time structure from large to small(er) systems with top quarks

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Top quarks have been recently proposed as a unique probe to determine the space-time evolution of the medium that is created in heavy-ion collisions [1]. In particular, they allow an approximate determination of the time at which the top's decay products start interacting with the QGP, making this channel most sensitive to the late time dynamics of the produced medium. This is achieved by using the hadronic decay chain of the top quark: in addition to the finite lifetimes of the top and W-boson, the time-delay in the interaction of the (colour-singlet) W-boson's decay products with the medium adds to a finite total time-delay that can be applied to probe different QGP timescales.

Top quarks have already been measured in nuclear collisions. With the forthcoming HL-LHC and HE-LHC, the increase in luminosity and energy can be further explored to use top quark observables as a unique probe of the QGP. In this talk, we show the latest projections for the use of this particular channel in both PbPb and lighter ions collisions in these two setups.

[1] L. Apolinário, J. G. Milhano, G. Salam, C. Salgado, Phys.Rev.Lett. 120 (2018) no.23, 232301

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