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Incorporating Mass Effects of Plasma Constituents in Heavy Fermion Energy Loss Calculations in hot QED and QCD

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In this short talk, I will review the energy loss experienced by an energetic fermion with mass (M) traversing a hot QED/QGP plasma at finite temperature (T). These kind of computations were carried for the first time more than 30 years ago by Bjorken, were later reviewed by Braaten and Thoma and more recently by Peshier and Peigné. In those computations, the mentioned authors assumed that the fermionic constituents of the plasma are massless, as this is a reasonable approximation in the scenarios where those computations are relevant.

In our recent work, we generalize those energy loss computations including a perturbative small mass (m) for the plasma constituents, such that $m \ll T$. We also give the necessary ingredients to carry out the computations for values of the mass close to the temperature.

Our findings reveal that for fermion masses around the soft scale eT , mass corrections are in line with pure perturbative corrections. However, as the fermion mass increases, the impact of mass corrections becomes dominant. Additionally, we assess the implications of these corrections on collisional energy loss in a QCD plasma.

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