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Fluctuating Open Heavy Flavour Energy Loss in a Strongly Coupled Plasma

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Heavy ion collisions at RHIC and at the LHC produce an enormous amount of energy that enables the nuclei and its constituent particles to melt, thus releasing gluons, quarks and antiquarks, travelling in different directions with different momenta. Studies of these collisions have shown that low transverse momentum observables describe a strongly coupled plasma (quark-gluon plasma), an almost perfect liquid that evolves hydrodynamically and flows with almost no viscosity. Focusing on observables related to high mass and high momentum particles, we numerically integrate the Langevin equation that describes the motion of unbound heavy quarks propagating in a strongly-coupled quark-gluon plasma. We present predictions for the suppression of the heavy flavor mesons that these heavy quarks decay to; we show that these predictions are in good agreement with experimental data. We outline future valuable measurements that will provide a vital consistency check for the assumed dynamics of the strongly-coupled quark-gluon plasma.

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