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Quenching parameter in a dual gravity closer to thermal QCD

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The yield of hadrons produced with high transverse momentum at RHIC and LHC has shown to be significantly suppressed in comparison with the cumulative yield of NN collisions. This effect, so called jet quenching was predicted to occur due to the energy loss suffered by hard scattered partons and can be understood in terms of a single "quenching parameter" $\hat{q}$, which can be obtained in a model-independent and nonperturbative way by the holographic set up on the duality of gauge-gravity. Usually in the holographic set up, the geometry in the gravity side at finite temperature was usually taken as the pure AdS black hole metric and hence their dual gauge theory is conformally invariant unlike QCD which depends on scale. Therefore we work on a local metric, known as as Ouyang-Klebanov-Strassler (OKS) model, where the coincident D7 branes as the fundamental quarks were embedded in the Klebanov-Tseytlin background. Later to switch on a finite temperature a black hole is inserted into the OKS background and the Hawking temperature will correspond to the gauge theory temperature, resulting the so-called OKS-BH metric. In the resulting dual gauge theory of OKS-BH metric, the coupling runs with the energy both in UV and infrared limit like QCD and hence proves to be a better background for thermal QCD, thus we obtain a strong-coupling calculations of $\hat{q}$ in terms of a particular light-like Wilson loop. We have calculated $\hat{q}$ for both short-distance and long-distance limit of the dipole, where $\hat{q}$ varies with the temperature as T^4 and depends on the light-cone time L^- both linearly and inversely in former limit and $\hat{q}$ aries linearly with T^4 and L^- in the latter limit.

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