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Prodding QGP in N=4 SYM with Stringy Yo-yos

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Abstract content (Max 300 words) **Formatting & Special chars**

In the last decade, significant strides have been taken by the high-energy physics community towards understanding the early evolution of the universe – namely the recent experimental production of quark-gluon-plasma (QGP), the deconfined state of QCD matter, which is hypothesized to have existed about a microsecond after the big bang. The properties of this partonic soup are not well understood because QGP is in the strongly coupled regime of QCD. However, using the framework of the anti-de-Sitter/conformal field theory (AdS/CFT) conjecture we are able to probe QGP in N=4 Super Yang Mills (SYM) at strong coupling through classical gravity calculations at weak coupling. In particular, we consider the thermalization of a “massless” quark which is dual to a string falling in a five-dimensional AdS-Schwarzschild background. Our modified “yo-yo” solution is constructed by fixing an end-point of a string (which is initially straight, fully-extended and later collapses to a single point) to a D0-brane situated at the horizon of the black hole in our five-dimensional geometry. This calculation is performed in the hope that it provides insight into the deviation of the computed jet nuclear modification factor at high transverse momenta (which has been previously calculated using AdS/CFT) from recent Large Hadron Collider (LHC) data.

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Yes

Level for award (Hons, MSc, PhD, N/A)?

Hons

Main supervisor (name and email) and his / her institution

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