

Department of Theoretical Physics

Free Meson Seminar

<i>Speaker</i>	:	Edmond Iancu (CEA-Saclay, France)
<i>Topic</i>	:	Parton picture at strong coupling from the AdS/CFT correspondence
<i>Day, Date & Time</i>	:	Thursday, November 15, 2007 at 2:30 p.m.
<i>Place</i>	:	AG 69

Abstract

Recent experimental results at RHIC combined with evidence from lattice QCD at finite temperature suggest that the deconfined form of hadronic matter produced in a high energy nucleus-nucleus collision is strongly interacting. Lattice QCD, which is the traditional non-perturbative tool in gauge theories, cannot be used to address dynamical phenomena, like scattering, thermalization, or transport coefficients. The AdS/CFT correspondence appears as a promising alternative, which allows us to study QCD-like gauge theories at strong coupling via semi-classical calculations in a special type of string theory. Very recently, we have for the first time used this method to address the problem of deep inelastic scattering off a strongly coupled $N=4$ supersymmetric Yang-Mills plasma at finite temperature, and thus discovered an interesting partonic description, which is however quite different from that in QCD at weak coupling.

In my talk, and after a brief review of the main motivations for this strong-coupling approach, I shall describe the formalism allowing the computation of the DIS structure functions at strong coupling in the supergravity approximation. By solving the relevant wave equations (for the gravitational perturbations of the AdS_5 black hole metric), we shall identify two physical regimes: (I) a low-energy (or low temperature) regime where the scattering is quasielastic and partons do not exist, and (II) a high energy regime where the wave is totally absorbed by the black hole, and partons exist, with occupation numbers of order one.

(Saumen Datta)