Ofer Aharony, Thursday 11/12 at 9:30am

Title : A gravity interpretation for the Bethe ansatz expansion of the N=4 SYM index

Abstract : This talk is based on work in progress with Francesco Benini, Ohad Mamroud and Paolo Milan. We review the form of the Bethe ansatz expansion for the N=4 SU(N) SYM index in the large N limit, including the known solutions to the Bethe ansatz equations, and including both perturbative and non-perturbative terms in 1/N. The index is related to the partition function of N=4 SYM on S^3xS^1, and in the large N limit it should be described by summing over Euclidean gravity solutions with appropriate asymptotic behavior. We show that (for the case of equal chemical potentials for the two angular momenta) each Bethe ansatz contribution arises from a specific supersymmetric (complex) black hole solution, which reproduces both its perturbative and its non-perturbative behavior. A priori there are many more gravitational solutions than Bethe ansatz contributions, but we show that by considering the non-perturbative effects, the extra solutions are ruled out, leading to a precise match between the solutions on both sides.