

**Enrico Rinaldi (RIKEN Nishina Center)**

Title: "Towards a non-perturbative study of quantum gravity effects"

Abstract: Lattice field theories are a useful tool to define gauge theories in their non-perturbative regime. At the same time, the gauge/gravity duality conjectures that certain gauge theories in the non-perturbative regime are dual to weakly-coupled gravity. This suggests the possibility of relating weakly-coupled gravity to gauge theories defined on the lattice. As a first step, this conjecture needs to be tested by comparing suitable observables on both sides of the duality.

This first step has been successfully carried out as I will show and the duality can be used as a non-perturbative definition of gravity via gauge theories defined on a lattice, and can make new and unexpected predictions.

I will show examples in D0-branes quantum mechanics and explore quantitatively and non-perturbatively both the gauge/gravity duality and phase transitions. In addition to testing the duality, we will add some predictions to stringy corrections in the gravity side, assuming the validity of the duality.