Speaker: **Thomas Gorin (University of Guadalajara)**

Title: **Quantum algorithms with non-unitary gates**

Date: **Friday, August 11th, 12:00 pm (s.t.)**

Place: **Seminar room 915**

Quantum algorithms with non-unitary gates

In the advent of quantum computation, it is natural to try to develop efficient quantum algorithms to solve optimization problems. Here we investigate the quantum vecinity of classical algorithms by adding some amount of coherence to the process. As it turns out even macroscopic properties such as the relaxation time can change dramatically due to this procedure.

In this talk, I will showcase the procedure starting from the classical zero-temperature Metropolis algorithm for the minimum search in an Ising spin system first without and then with random interactions. To this end we replace random which-path decisions by superpositions of all possible paths. We then show by numerical simulations that the resulting relaxation process can have very different scaling properties. For instance, depending on the particular choice of the quantum extension, the relaxation time may either be larger or smaller than the classical one. This remains true even when the decoherence rate is drastically increased.