NITheP cordially invites you to a seminar by

Dr Graeme Pleasance

University of KwaZulu-Natal

Date: Friday, 10th August 2018

Time**:** 11h30 -12h30

Venue: NITheP Seminar Room, 3rd Floor, H-Block

Title: Exact non-Markovian dynamics of an open quantum system using a chain representation of the environment

Abstract: A theoretical framework is developed to study the dynamics of an open quantum system in a setting where the environment - assumed to comprise a continuous bath of bosonic modes - is mapped onto a 1D tight-binding chain. It is shown that the exact system-environment dynamics can be formulated in terms of Heisenberg operator equations that describe the coupling of the system degrees of freedom to a set of damped discrete chain modes. From this result, we determine that the combined evolution of the system-plus-discrete modes is provided in terms of a master equation of Gorini-Kossakowski-Sudarshan-Lindblad (GKSL) form. Hence, the original non-Markovian problem can be fully amended to a quantum Markov (white noise) process by enlarging the open system to include the nearest chain modes which have an approximate flat coupling to the remaining bath. Our approach demonstrates the correct way to generalize the exact, non-perturbative result of the pseudomode method to cases involving multiple excitation of the reservoir with a Lorentzian-type spectrum.