NITheP cordially invites you to a seminar by:

Dr Lorenzo Pucci

National Institute for Theoretical Physics (NITheP) Stellenbosch, South Africa

Date: Wednesday 19 February 2014
Time: 14:00
Venue: NITheP Stellenbosch Node, Seminar Room

TITLE: Entropy production in Quantum Brownian motion

ABSTRACT:
We investigate how to coherently define entropy production for a process of transient relaxation in the quantum Brownian motion model for the harmonic potential. We compare a form, referred to as 'poised' (P), which after non-Markovian transients corresponds to a definition of heat as the change in the system Hamiltonian of mean force, with a recent proposal by Esposito et al (ELB) based on a definition of heat as the energy change in the bath. Both expressions yield a positive-definite entropy production and they coincide for vanishing coupling strength, but their difference is proved to be always positive (after non-Markovian transients disappear) and to grow as the coupling strength increases. In the classical over-damped limit the 'poised' entropy production converges to the entropy production used in stochastic thermodynamics. We also investigate the effects of the system size, and of the ensuing Poincar´ recurrences, e and how the classical limit is approached. We close by discussing the strong-coupling limit, in which the ideal canonical equilibrium of the bath is violated.

Navrae/Enquiries: René Kotzé
Tel: 021 808 2653
Email: renekotze@sun.ac.za