



NITheP cordially invites you to a seminar by:

Dr Jules Morand

NITheP Stellenbosch Node

Date: Wednesday 10 February 2016
Time: 14:00
Venue: NITheP Seminar room

TITLE: Dynamics of long range interacting systems beyond the Vlasov limit.

ABSTRACT: Long range interactions concern numerous natural systems. A notable example is the one of gravitation which is especially relevant in the study of a stars system or a galaxy cluster. In particular, these systems does not respect the additivity of thermodynamical potential and present a dynamics dominated by collective (mean-field) effects. One of the most remarkable feature is that, after a very rapid evolution, these systems remains trapped into quasi-stationary states up to a very long time (diverging with the system size). Simulations have shown that if such systems relax to thermal equilibrium, this happens on time scales diverging with the system size. Quasi-stationary states are theoretically interpreted as solutions of the Vlasov equation. In the limit of a large number of particles, this mean field equation represents a very good approximation of the dynamics of long range systems. In this talk, we first present an analysis on the validity of the Vlasov equation depending on the range of the pair force and on its short scale regularisation. In a second part, using theoretical and numerical approach, we study the modification of the dynamics of long range systems when subjected to different kinds of non-Hamiltonian perturbations. In particular, the robustness of quasi-stationary states, in presence of these different perturbations is analyzed in details.

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