ESF - Short Visit Grants 723
RDSES programme

Scientific Report

Purpose of the visit
   Collaboration among the visiting scientist (C.Giardinà) and the host scientist (J.Kurchan)

Description of the work carried out during the visit
   We have investigated the possibility of a direct evaluation of the probability of large deviation observables (such as current or densities) in non-equilibrium system. They are given in terms of the typical properties of a modified dynamics, and since they no longer involved rare events, can be evaluated efficiently. We applied the method to two standard case: the current fluctuations of the Totally Asymmetric Exclusion Process and the Entropy production distribution of a driven Lorentz gas.

Description of the main results obtained
   The method has been tested on the two system mentioned above. It allowed to reach a level of accuracy in the verification of the Gallavotti-Cohen theorem which is much beyond any available standard technique. This should open the way for tests of the fluctuation relation of local quantities or under strong drive, of large fluctuations in higher dimensional systems, and tests of the additivity principle, which is related to the validation of the Fourier law.

Future collaboration with host institution
   We expect future collaboration with the host scientist.

Projected publications/articles resulting or to result from your grant
   We are currently finalizing a paper to be submitted to Phys. Rev. Lett.

Other comments
   The visiting scientist has actually spent a period longer (1-31 October 2005) than the one covered by the Short-Visit-Grant (1-15 October 2005). The host institution offered the financial support for the second half-period of the visit.