Colóquio Interinstitucional

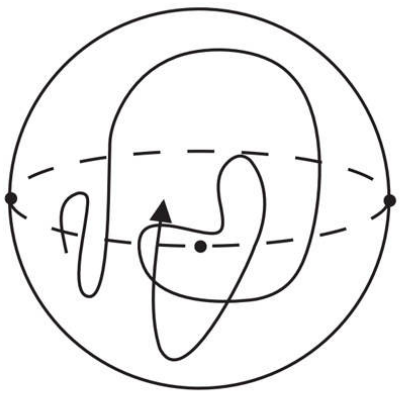
Modelos Estocásticos e Aplicações

Quarta-feira, 7 de maio de 2014

Programa

14:00 - 15:20 – **Étienne Ghys (ENS - Lyon)**

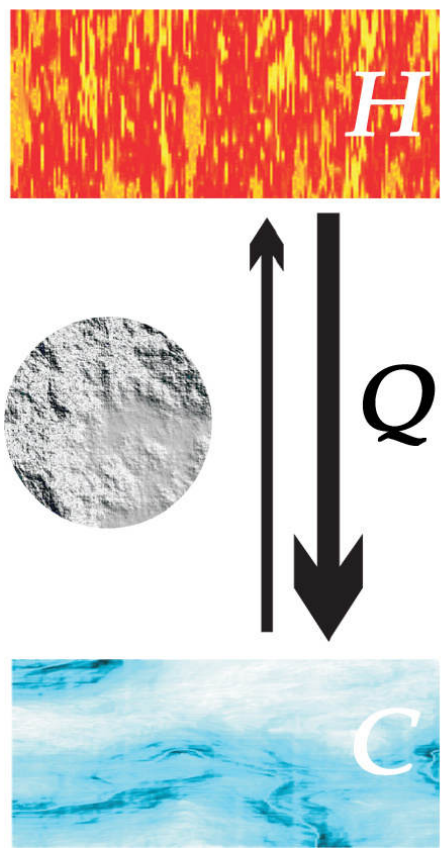
Random diffeomorphisms of the circle



In dynamical systems one usually considers the dynamics of "typical diffeomorphisms". Of course, one of the very first questions is to define "typical"! Pioneers used Baire category: countable intersections of open and dense sets. Later, Kolmogorov suggested to use the concept which is called today "prevalence": some kind of substitute for the Lebesgue measure in infinite dimension. In this talk, I will begin by explaining the advantages and drawbacks of these two notions. Then, I will restrict myself to the 1 dimensional case and discuss the Malliavin-Shavgulidze measure on the group of diffeomorphisms of the circle, related to the Brownian motion. It will be a pleasant opportunity to advertise part of the PhD thesis of my latest student: Michele Triestino. One would like to understand the dynamics of almost all diffeomorphism of the circle, with respect to this Malliavin-Shavgulidze probability.

15:40 - 17:00 – **Sílvio M. Duarte Queirós (CBPF)**

Thermostatistical idiosyncrasies of small non-linear mechanical systems



As stated in any textbook, Thermodynamics is the field of Science devoted to the study of relations between macroscopic observables of a system such as heat, work, energy. The microscopic understanding of the macroscopic laws that Thermodynamics provide us with was finally achieved by means of the application of probabilistic concepts to mechanical systems within the Statistical Mechanics approach and the assumption of the macroscopic (Thermodynamic) limit. However, as technology has moved on, interesting systems have downsized and one has started facing the study of heat, energy and work relations clearly off the thermodynamical limit. Although the (standard) macroscopic laws of Thermodynamics are thus crippled, it is possible to establish equivalent relations which allow predicting the behaviour of physical quantities such as the injected (dissipated) power into (out of) the system, the heat flux within it as well as several other fluctuation relations.

Along these lines, I will present some results on the thermostatistical properties of small in- and out-of-equilibrium massive systems subject to non-linear potentials and in contact with Gaussian and non-Gaussian reservoirs with the context of the Lévy-Itô theorem. A typical example of thermostats of the latter ilk is the Poissonian (shot-noise) heat bath that can be regarded as a means of describing the energy input to particles by ATP hydrolysis - a phenomenon that can be found in molecular motors. A special emphasis to the physical significance of higher than two statistical cumulants of non-Gaussian reservoirs will be given. Moreover, it will be shown that they can be interpreted as supplementary heat sources.

17:00 – Discussão e lanche

Local

Centro de Tecnologia – UFRJ
Sala C-116 - Bloco C
Ilha do Fundão

Realização: CBPF, impa, PUC Rio, uff

Apoio: FAPERJ

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