Large deviations and entropy production in viscous fluid flows I and II

Armen Shirikyan [*]

Armen.Shirikyan@u-cergy.fr

Vahagn Nersesyan [†]

vahagn.nersesyan@uvsq.fr

In the first part of the talk, we review a general framework of the theory of entropic fluctuations in deterministic and stochastic systems. Several questions of interest will be formulated, together with the difficulties encountered in the context of randomly forced PDEs. We also consider an example of the Burgers equation perturbed by random kicks for which these difficulties can be overcome. The second part of the talk is devoted to the problem of large deviations and entropy production for the 2D Navier-Stokes system coupled with a Lagrangian particle. We first formulate a new criterion that allows one to derive the LDP from some controllability properties of the underlying deterministic problem. We next turn to a more detailed study of the large-time asymptotics of the particle and discuss the question of entropy production for it.

This talk is based on joint works V. Jakšić and C.-A. Pillet.

[*]Département de mathématiques, Université de Cergy-Pontoise, Saint-Martin, 2 avenue Adolphe Chauvin, 95302 Cergy-Pontoise Cedex, FRANCE
[†]Laboratoire de Mathématiques, Université de Versailles-Saint-Quentin-en-Yvelines, 45, av. des Etats-Unis, bureau 2303, 78035, Versailles Cedex, FRANCE