Prof Jan Wehr

University of Arizona

Thursday, November 3, 2016
4 – 5 pm
Rm 277 WCharlton Building

Time Scale Interaction in Diffusive Systems – Experiment and Mathematics

An experiment performed in 2011 in Naples studied a nonlinear electrical circuit in the presence of noise. In addition to the characteristic noise correlation time, another small time scale present in the system was the delay with which the system was responding to the noise. As both these times were varied in a controlled way, it was observed that the dynamics of the circuit was changing, according to a simple pattern. In a joint work with the authors of the experiment, we have explained this effect, deriving the effective stochastic differential equation, followed by the system in the limit of small delay and small noise correlation time. In view of their potential applications, the results of this work, in which two graduate students at the University of Arizona were also involved, were published in Nature Communications. Subsequently, a much more general result was proven, showing the pattern in which several small time scales compete and interact in diffusive systems. I am going to describe the experiment, introduce its mathematical model and present the theorem, putting it in the context of classical stochastic analysis. This is a joint work with Scott Hottovy, Austin McDaniel, Giuseppe Pesce and Giovanni Volpe. From a broad point of view, the effect studied in this work is an example of a *noise-induced drift*, also present in other diffusive systems.

Refreshments served 3:15 – 3:45 pm in the Faculty & Graduate Student Lounge
Rm 4118 French Hall West

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