# On the relationship between directed percolation and the synchronization transition in spatially extended systems

Francesco Ginelli

Istituto Nazionale di Ottica Applicata, Firenze, Italy

In recent years, it has been recognized that the synchronization transition of chaotic spatially extended dynamical systems (like CML's, for instance) exhibits different critical properties depending on the smoothness of the local dynamics or, equivalently, on the stability properties of the extended system. A sufficently smooth local dynamics seems to yield a Multiplicative Noise (MN) second order nonequilibrium transition. In this case, the linearized dynamics can be mapped onto the Langevin equation for MN, where the noise amplitude is proportional to the field itself. Systems characterized by a localized discontinuity (high nonlinearities) on the other hand, seem to display Directed Percolation (DP) critical properties. In this brief talk we clarify the role played by finite-size indicators in the identification of a true DP absorbing state in the synchronization problem, and we propose an equation for the tamporal evolution of the synchronization error, that holds when the linearization hypothesis fails. Such an equation can be mapped on the field equation of DP, where the noise amplitude is proportional to the square root of the field.