1030-92-431 **Hermann Riecke***, Department of Mathematics, Northwestern University, **A. Roxin**, Department of Mathematics, Universitat Pompeu Fabra, and **S. Madrug**, MPI Complex Systems.

Multiple Attractors and Long Chaotic Transients in Small-World Networks of Excitable Neurons.

To study the effect of heterogeneous connectivity on networks of N excitable elements (neurons) we investigate small-world networks of integrate-fire neurons in which the local bi-directional connections are supplemented by long-range uni-directional links ('short-cuts'). For low short-cut densities our simulations show the coexistence of a large number of attractors ($\mathcal{O}(N)$) with persistent periodic activity. For high wave propagation speeds a smooth transition from persistent activity to failure occurs as the density of short-cuts is increased. It can be described semi-quantitatively by a mean-field theory. For low speeds long chaotic transients arise. The distribution of their life-times follows a stretched exponential. The dependence of the life-times on the wave speed exhibits intricate, non-monotonic behavior that is not understood yet. (Received August 23, 2007)