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Noise-induced transitions in bistable electronic systems

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Bistable systems occur throughout the natural sciences and when such systems are subjected to random noise, one observes probabilistic transitions between co-existing metastable states. Such behavior is found in chemical reaction kinetics, driven nonlinear mechanical systems, nonlinear electronic transport systems, climate variability models, and pulse propagation dynamics in neurons, to name but a few. In this talk, I will discuss recent work carried out in my group on noise-induced transitions in bistable systems that are far from thermal equilibrium. Experimental studies focus on switching transitions between distinct states of electrical current flow in quantum tunneling structures such as semiconductor superlattices and tunnel diodes.