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Scaling crossovers in activated escape of nonequilibrium systems: a resonantly driven oscillator[1] OLEG KOGAN, California Institute of Technology, IRA SCHWARTZ, Naval Research Laboratory, MARK DYKMAN, Michigan State University — The rate of metastable decay in nonequilibrium systems is expected to display scaling behavior: i.e., the logarithm of the decay rate should scale as a power of the distance to a bifurcation point where themetastable state disappears. Recently such behavior was observed and some of the earlier predicted exponents were found in experiments on several types of systems described by a model of a modulated oscillator. Here we establish the range where different scaling behavior is displayed and show how the crossover between different types of scaling occurs. The analysis is done for a nonlinear oscillator with two coexisting stable states of forced vibrations. We map out the entire parameter range. We find the regions where the scaling exponents are 1 or 3/2, depending on the damping. We also uncover new scaling behavior which extends, numerically, beyond the close vicinity of the bifurcation point. The results of the numerical calculations based on the instanton method are compared with the results of Monte Carlo simulations.

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