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Noise-induced nucleation in a bistable tunnel diode circuit R.A. MCGEEHAN, S.J. JONES, YU. BOMZE, S.W. TEITSWORTH, Duke University — We report the measurement of first-passage time distributions associated with electrical current switching in a bistable tunnel diode circuit driven by a noise generator with adjustable noise intensity D. In such a system, it is particularly interesting to study the behavior of the mean switching time τ near the boundary of the bistable regime where the metastable state approaches and collides with a saddle point in the underlying noise-free dynamical system. In the tunnel diode circuit and for sufficiently large noise intensity, we find a *linear* scaling relationship $\ln \tau \propto |V - V_{th}| / D$ valid over several decades of time, where V denotes the applied voltage and V_{th} denotes the value corresponding to the end of the bistable regime. At smaller noise intensities, we typically find that the mean switching time versus $V - V_{th}$ possesses multiple scaling regimes. These experimental results are interpreted in light of theoretical work that shows how lateral charge transport dynamics can strongly affect the noise-induced nucleation events that lead to current switching [1]. [1] O. A. Tretiakov and K. A. Matveev, Phys. Rev. B **71**, 165326 (2005).

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