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Switching time distributions and scaling behavior in a bistable tunnel diode circuit with adjustable noise intensity[1] STEVEN 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 tunnel diode circuit that is driven by a noise generator with adjustable noise intensity D. The tunnel diode circuit is biased with a voltage V_{f} that is set in a range of bistability which terminates at the upper end in a saddle-node bifurcation at voltage V_{th}. We employ a high bandwidth technique that permits measurement of stochastically-varying switching times over a very large dynamic range [1], with measured times ranging from 1 μs to several seconds. The dependence of both the form of the distribution and extracted mean switching time τ are also studied as a function of reduced voltage $V_{\mathrm{th}}-V_{\mathrm{f}}$ and D. Switching time distributions are generally found to possess exponential tails at long times, consistent with a picture of noise-induced escape via a single saddle point. Also, parameter regimes are identified in which the mean switching time scales as reduced voltage to the 3/2 power and linearly with inverse noise intensity. [1] Yu. Bomze, R. Hey, H. T. Grahn, and S. W. Teitsworth, Phys. Rev. Lett. **109**, 026801 (2012).

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