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Work fluctuations in modulated systems: what is and what is not universal in the steady state MARK DYKMAN, Michigan State University — We study work fluctuations in periodically modulated nonlinear systems. Such systems often have coexisting stable periodic states. We show that the standard relations of the steady-state work fluctuation theorem derived for linear systems do not generally apply to nonlinear systems. Work fluctuations sharply increase near a kinetic phase transition where populations of the coexisting periodic states are close to each other. The work variance in this range is inversely proportional to the rate of fluctuational interstate switching. It exponentially decreases with the increasing distance to the phase transition point. We also show that the work variance in a metastable state displays scaling with the distance to the bifurcation point where this state disappears. The critical exponent in the dependence of the variance on the distance to a saddle-node bifurcation point is -1. The results apply to a broad range of vibrational systems of current interest, from trapped electrons to Josephson junctions and to nano- and micromechanical resonators.

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