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Out of equilibrium phase dynamics in ferromagnetic Josephson junctions IVANA PETKOVIC, MARCO APRILI, Laboratoire de Physique des Solides, Univ. Paris-Sud, CNRS, UMR 8502, F-91405 Orsay Cedex, France — With a pump-probe measurement performed below 1K, we probe the switching mechanism of strongly underdamped ferromagnetic Josephson junctions in the classical limit. At equilibrium or for slow sweeps, we observe that the switching is governed by thermal fluctuations, as expected. When the sweep frequency is comparable to the inverse phase relaxation time, we observe premature switching due to phase bifurcation. From the frequency dependence of the switching probability we directly deduce the phase relaxation time τ=1/RC, where R is the quasiparticle resistance and C the junction capacitance. Moreover, we observe a peculiar scaling of the Fiske steps (resonances between the Josephson phase and the electromagnetic cavity modes) with the junction length: the resonance frequencies are not multiples of the inverse junction length, but present a finite offset. We attribute this offset to the high frequency ferromagnetic susceptibility.

Ivana Petkovic
Laboratoire de Physique des Solides, Univ. Paris-Sud,
CNRS, UMR 8502, F-91405 Orsay Cedex, France

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