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Nonequilibrium quantum criticality in bilayer itinerant ferromagnets[1] WILLIAM WITCZAK-KREMPA, University of Toronto, SO TAKEI, Max-Planck-Institut Stuttgart, YONG BAEK KIM, University of Toronto — We present a theory of nonequilibrium quantum criticality in a bilayer system of itinerant electron magnets. The model consists of a first layer subjected to an inplane current and open to an external substrate. The second layer is closed and subject to no direct external drive, but couples to the first layer via spin exchange interaction. No particle exchange is assumed between the layers. We derive an effective action in terms of two coupled bosonic fields which are related to the magnetization fluctuations of the layers. In the absence of interlayer coupling, the bosonic modes possess different dynamical critical exponents z with z = 2 (z = 3) for the first (second) layer. This results in multiscale quantum criticality in the coupled system. It is shown that the low energy fixed point characterized by the larger dynamical exponent. The perturbative RG is used to study the correlation length in the quantum disordered and quantum critical regimes. We also derive the stochastic dynamics obeyed by the critical fluctuations in the latter regime.

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