Quantum phase transition in space in a ferromagnetic spin-1 Bose-Einstein condensate BOGDAN DAMSKI, WOJCIECH ZUREK, Los Alamos National Laboratory — A quantum phase transition between the symmetric phase and the phase with broken symmetry can be induced in a ferromagnetic spin-1 Bose-Einstein condensate by an inhomogeneous magnetic field. We consider such a phase transition and show that the transition region in the vicinity of the critical point exhibits scalings that reflect a compromise between the rate at which the transition is imposed (i.e., the gradient of the control parameter) and the scaling of the divergent healing length in the critical region. Our results explore analogies between dynamics of quantum phase transitions induced by time-dependent (Kibble-Zurek mechanism, etc.) and position-dependent variations of the driving field. They also suggest a new method for the direct measurement of the scaling exponent ν. This work is summarized in: B. Damski and W.H. Zurek, New J. Phys. **11**, 063014 (2009).

Bogdan Damski
Los Alamos National Laboratory

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