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Non-Ginzburg-Landau Type Universality in Quantum Metamagnetism Induced by Topological Change of Fermi Surface: Applications to a Weak Itinerant-Electron Ferromagnet $ZrZn_2$[1] YOUHEI YAMAJI, TAKAHIRO MISAWA, Dept. of Applied Physics, Univ. Tokyo, MASATOSHI IMADA, Dept. of Applied Physics and JST-CREST, Univ. Tokyo — We clarify that metamagnetic transitions show unconventional properties as quantum phase transitions if they are accompanied by changes in Fermi-surface topology. Topological change of the Fermi surface makes the phase diagram qualitatively different from that of the conventional metamagnetic transitions; the quantum critical endpoint becomes not only the terminal of the finite-temperature critical line, but also the terminal of a quantum critical line of continuous Lifshitz transitions. Around the *quantum critical terminal*, power-law singularities of thermodynamic quantities are determined by the Fermi-surface topology and, therefore, are characterized *neither* by the Ising symmetry breaking *nor* by the Ginzburg-Landau-Wilson scheme proposed by Moriya, Hertz and Millis for the conventional quantum criticalities. We propose that such an unconventional universality indeed accounts for the metamagnetic transitions observed in $ZrZn_2$.

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