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Non-Fermi-liquid at (2+1)d ferromagnetic quantum critical point[1] XIAO YAN XU, Institute of Physics, Chinese Academy of Sciences, KAI SUN, University of Michigan, YONI SCHATTNER, Weizmann Institute of Science, EREZ BERG, Weizmann Institute of Science and University of Chicago, ZI YANG MENG, Institute of Physics, Chinese Academy of Sciences — Itinerant quantum critical points (QCPs), existing in heavy-fermion materials and transition-metal alloys, have constantly attracted people's attention. The reason of the intensive focus, partially, is that controlled investigation of such systems have been proved extremely difficult and consensus has not be reached. Attempts to analytically treat the problem, starting from the celebrated Hertz-Millis-Moriya framework, have provided valuable insights, but a full, controlled solution is still lacking. Here, we design a quantum Monte Carlo technique, that can study the itinerant QCP in an unbiased manner. By constructing a ferromagnetic QCP with Fermi surface coupled to ferromagnetic bosonic critical fluctuations, we have successfully realized a continuous quantum phase transition in itinerant ferromagnet in (2+1)d. Interestingly, at the QCP, clear signature of non-Fermi-liquid behavior in the fermion propagators manifests. Due to the coupling between fermions and bosonic modes, the (2+1)d ferromagnetic universality has also been found neither the naive bosonic one (i.e., (2+1)d Ising) nor the Hertz-Millis-Moriya prediction.

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