Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Quantum criticality on ferromagnetic systems: it is not where you think it is! VALENTIN TAUFOUR, UDHARA KALUARACHCHI, MANH CUONG NGUYEN, STELLA K KIM, XIAO LIN, EUN DEOK MUN, HYUNSOO KIM, YUJI FURUKAWA, CAI ZHUANG WANG, KAI MING HO, SERGEY L BUD'KO, PAUL C CANFIELD, Ames Laboratory / Iowa State University, Ames, IA 50011, USA, ZURAB GUGUCHIA, RUSTEM KHASANOV, Laboratory for Muon Spin Spectroscopy, Paul Scherrer Institute, CH-5232 Villigen PSI, Switzerland, PIETRO BONFA, ROBERTO DE RENZI, Dipartimento di Fisica e Scienze della Terra, Parco Area delle Scienze 7/A, I-43124 Parma, Italy — When a ferromagnetic-paramagnetic transition is tuned to 0 K by application of pressure in clean systems, the transition becomes of the first order at a tricritical point before disappearing. Instead of having a quantum critical point, i.e. a second order transition at 0 K, there is a quantum phase transition of the first order. The quantum phase transition can be from a ferromagnetic to a paramagnetic phase, or to a spatially modulated phase. We illustrate this case on a new material: $LaCrGe_3$. We will present the temperature-pressure-magnetic field phase diagram of $LaCrGe_3$ and show that quantum criticality is avoided by the appearance of a modulated phase. We will also explain how quantum criticality can be re-introduced. Work at Ames Laboratory was supported by US DOE under the Contract No. DE-AC02-07CH11358. Magnetization measurements under pressure were supported by Ames Laboratory's laboratory-directed research and development (LDRD) funding.

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Date submitted: 05 Nov 2015 Electronic form version 1.4