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Investigation of the Competition between Structural and Ferromagnetic Transitions in $GdRu_2$ using the Mossbauer Effect[1] DERMOT COFFEY, MICHAEL DEMARCO, RYAN HEARY, Dept. of Physics, Buffalo State College, NY 14222, PEI-CHUN HO, TODD SAYLES, M. BRIAN MAPLE, Dept. of Physics, University of California, San Diego, CA 92093, STEVE TOORONGIAN, MICHAEL HAKA, Nuclear Medicine Department, State University of New York at Buffalo, NY 14260 — We use the ^{99}Ru Mossbauer Effect(ME) to investigate magnetism in the Laves phase $Ce_{1-x}Gd_xRu_2$ series. This series of compounds is superconducting for small x and has been thought to be ferromagnetic for large x on the basis of extrapolations of Curie-Weiss fits to the χ(T) data. We have studied the temperature dependence of the ME spectra for a number of these compounds and found no evidence of a hyperfine magnetic field due to ferromagnetic order. In $GdRu_2$, a Curie-Weiss fit to the χ(T) data above 120K yields a Curie-Weiss temperature of 93K. However, at $\sim 120K$, χ^{-1} deviates from a straight line fit. The ME spectra show that there is a qualitative change in the environment of the Ru nucleus in this temperature re gion pointing to a structural phase transition. Below this transition the width of the ME spectrum grows with decreasing temperature by 50% between 100K and 4.2K. We analyze this temperature dependence in terms of a slowing down of the fluctuations of the local field due to Gd moments.

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