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Using metamagnetism to uncover 5f2 doublets in U($Ru_{1-x}Rh_x$)$_2Si_2$, and implications for Ordering[1] NEIL HARRISON, ALEJANDRO SILHANEK, CRISTIAN BATISTA, MARCELO JAIME, Los Alamos National Labs, HIROSHI AMITSUKA, Hokkaido Univ., N10W8 Sapporo 060-0810, Japan, JOHN MYDOSH, Max-Planck Inst. Chem. Phys. of Sol., Dresden, Germany — The specific heat of U($Ru_{1-x}Rh_x$)$_2Si_2$ (with $0 < x < 4\%$) at high magnetic fields isfound to be very comparable to that of $CeRu_2Si_2$, and can be fit to a simple resonance model, with the resonance split away from the Fermi energy by the Zeeman interaction. The combined success of simulations to reproduce the experimental data and similarities with the well-defined Kondo lattice system $CeRu_2Si_2$ provide strong indications of a low energy magnetic doublet for U, which is expected to be in the $5f_2$ configuration. In contrast to $CeRu_2Si_2$, which shows no sign of ordering in the vicinity of the metamagnetic quantum critical point, U($Ru_{1-x}Rh_x$)$_2Si_2$ exhibits numerous ordered phases as a function of Rh-doping and magnetic field, which are the likely consequence of stronger couples between $5f$ electros than $4f$ electrons. We discuss the possibility of magnetic and electric quadrupolar ordering.

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