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CeRu2Al2B: A new local moment 4f magnet with a complex T-H phase diagram RYAN E. BAUMBACH, X. LU, K. GOFRYK, F. RONNING, J.D. THOMPSON, Los Alamos National Laboratory, H. CHUDO, HIROSHI YASUOKA, Los Alamos National Laboratory, Los Alamos, NM 87545, USA, Advanced Science Research Center, Japan Atomic Energy Agency, Tokai, Ibaraki, JAPAN, C.H. WANG, V.O. GARLEA, A.D. CHRISTIANSON, Oak Ridge National Laboratory, E.D. BAUER, Los Alamos National Laboratory — There is ongoing interest in the study of Ce-based compounds that are derivatives of certain structure types (e.g., $ThCr_2Si_2$and PbClF), as they are often associated with correlated electron phenomena. We will report results for a new system that falls into this category, $CeRu_2Al_2B$. This compound crystallizes in a filled variant of the layered/tetragonal $CeMg_2Si_2$ structure. Contrary to what is often observed for Ce-based compounds, we find pronounced local moment behavior of the Ce ions, resulting in complicated magnetic ordering at strikingly high temperatures: i.e., antiferromagnetism (AFM) at $T_N = 14.1$ K followed by ferromagnetism (FM) at $T_C = 12.8$ K, which is first order in character. We also find a temperature-magnetic field phase diagram that consists of three distinct ordered phases: (1) AFM, (2) spin reoriented, and (3) FM. Since this type of behavior is unusual for Ce-based compounds, we will discuss prospects for suppressing the ordered state toward $T = 0$ in order to produce a Doniach-like phase diagram, which may provide a route towards a FM quantum critical point.

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