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Observation and Control of exotic magnetic domain structures in ferromagnetic $\text{CeRu}_2\text{Ga}_2\text{B}$ JEEHOON KIM, R. BAUMBACH, O. AYALA-VALENZUELA, K. BARROS, K. YASUYUKI, I. MARTIN, L. CIVALE, E. BAUER, F. RONNING, J. D. THOMPSON, R. MOSHOVICH, Los Alamos National Laboratory — The structure of magnetic domains in a single crystal of $\text{CeRu}_2\text{Ga}_2\text{B}$ was investigated using low-temperature magnetic force microscopy (MFM) over a wide range of fields and temperatures. The low Curie temperature ($T_C \approx 16$ K) allows for extensive tunability, revealing a rich variety of magnetic states including branched stripes, bubble domains, and finger-like domains. In addition to the higher spatial resolution, the advantage of MFM over optical imaging techniques is the ability to manipulate magnetic domains. In particular, we are able to manipulate (move and destroy) individual circular domains with the MFM tip, which suggests that we observe unusual spherical ‘bubble’ domains (as opposed to cylindrical ones, with round terminations at the surface). Our results clarify the origins and illustrate the diversity of the domain structures in nearly ferromagnetic compounds.

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