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Kibble-Zurek Mechanism in a Spin-1 Ferromagnetic BEC MARTIN ANQUEZ, BRYCE ROBBINS, H.M. BHARATH, MATTHEW BOGUSLAWSKI, THAI HOANG, MICHAEL CHAPMAN, Georgia Inst of Tech — A ferromagnetic spin-1 ^{87}Rb BEC exhibits a second-order gapless quantum phase transition due to the competition between magnetic and collisional spin interaction energies. In such a system, we expect to observe universal Kibble-Zurek power-law scaling of the excitations for slow quenches through the critical point. In spatially extended systems, the Kibble-Zurek mechanism is manifest in topological defects. In our small spin condensates, the excitations appear in the temporal evolution of the spin populations.[1] In this poster, we present our experimental investigation of the spin excitations as a function of the quench speed when the system is driven from the polar to ferromagnetic phase. Our results are quantitatively compared with quantum simulations.

[1]Damski, B., & Zurek, W. H. (2007). Dynamics of a Quantum Phase Transition in a Ferromagnetic Bose-Einstein Condensate. Physical Review Letters, 99(13), 130402.

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