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Enhanced Magnetic Trap Loading for Alkaline-Earth Atoms BENJAMIN J. RESCHOVSKY, DANIEL S. BARKER, NEAL C. PISENTI, GRETCHEN K. CAMPBELL, JQI, University of Maryland and NIST, College Park, MD, 20742 — We report on a technique to improve the continuous loading of atomic strontium into a magnetic trap from a Magneto-Optical Trap (MOT). This is achieved by adding a depumping laser addressing the $^3P_1$ level. For the $^3P_1 \rightarrow {}^3S_1$ (688-nm) transition in strontium, the depumping laser increases atom number in the magnetic trap and subsequent cooling stages by up to 65 % for the bosonic isotopes and up to 30 % for the fermionic isotope. We optimize this trap loading strategy with respect to the 688-nm laser detuning, intensity, and beam size. To understand the results, we develop a one-dimensional rate equation model of the system, which is in good agreement with the data. We discuss the use of other transitions in strontium for accelerated trap loading and the application of the technique to other alkaline-earth-like atoms.

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