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Self-Organization Threshold Scaling for Thermal Atoms KYLE ARNOLD, MARKUS BADEN, MURRAY BARRETT, National University of Singapore — We report a detailed experimental study of the threshold for self-organization of thermal Rb atoms coupled to a high finesse cavity. We investigate the differences between probing with a traveling wave and a retroreflected lattice over a range of atom numbers and cavity detunings. In both cases we confirm a N^{-1} scaling of the threshold with atom number. Additionally, we report the trapping of 10^5 Rb atoms in a deep two-dimensional optical lattice with a lattice spacing of the wavelength of the scattered light. In this configuration collectively enhanced scattering into the cavity is observed. This setup will enable the investigation of cavity cooling, simulation of the Dicke model, and other phenomena related to collective scattering into a cavity.

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