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Single-Photon Atomic Cooling TRAVIS BANNERMAN, GABRIEL PRICE, KIRSTEN VIERING, ED NAREVICIUS, MARK RAIZEN, Center for Nonlinear Dynamics and Department of Physics, The University of Texas at Austin — We report on a new method of laser cooling and phase space compression which does not rely on the momentum transfer between many photons and an atom. Whereas most laser cooling techniques (e.g. Doppler cooling, optical molasses, Raman cooling) require a cycling transition to allow for the scattering of many photons, our technique scatters on average only one photon from each atom. This is advantageous because the technique is not limited to the small subset of atoms in the periodic table which possess a cycling transition. The technique may potentially be extended to the cooling of polar molecules and atomic hydrogen.

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