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Efficient Cooling of Paramagnetic Atoms with Single Photons TRAVIS BANNERMAN, GABRIEL PRICE, KIRSTEN VIERING, MARK RAIZEN, Department of Physics, The University of Texas at Austin — Complete deceleration of supersonic beams of atoms has recently been demonstrated using pulsed magnetic fields. Any atom with a magnetic moment may be decelerated with this technique, opening the door to magnetically trapped samples of nearly any atom in the periodic table at temperatures in the tens of millikelvins. Further cooling of these atoms is not practical with traditional laser cooling methods or evaporative cooling. We review our cooling technique which only requires the atom to possess a magnetic moment and an accessible electric dipole transition. Nearly complete removal of each atom's kinetic energy is achieved through the scattering of a single photon, in a manner characteristic of Maxwell's demon. We present data with ^{87}Rb and outline the implementation of "single-photon cooling" for hydrogen isotopes.

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