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Single-photon cooling in an rf-dressed magnetic trap TRAVIS BANNERMAN, The University of Texas at Austin, EDVARDAS NAREVICIUS, Weizmann Institute of Science, MARK RAIZEN, The University of Texas at Austin — The cooling and trapping of atoms in the gas phase has been a major theme of physics research in the last several decades. Progress has largely been enabled by the development of laser cooling techniques, which, though powerful, have been successfully implemented with only a handful of atomic species. Our group has recently demonstrated a general cooling technique that, by requiring the scattering of only a single photon, circumvents the restrictions inherent in traditional laser cooling techniques. The efficiency of the cooling was shown to be limited only by the dynamics of the initially trapped atoms. Here we show how the cooling efficiency may be improved with the use of an rf-dressed magnetic trap, with final temperatures approaching the recoil temperature. We outline the implementation of single-photon cooling for hydrogen, an atom which cannot be cooled with traditional techniques. We also consider the application of single-photon cooling to molecules.

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