Abstract Submitted
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Toward Ultracold Atomic Hydrogen and Deuterium: An Application of Buffer Gas Cooling BONNA NEWMAN, CORT JOHNSON, NATHAN BRAHMS, ROBERT DECARVALHO, CHIH-HAO LI, TOM GREYTAK, DAN KLEPPNER, JOHN DOYLE — Ultracold samples of atomic H and D offer unique possibilities for precision spectroscopy and studies of quantum fluids. Current techniques to cool H are limited by the small H-H elastic scattering cross section and require a superfluid He film in the initial thermalization. The film limits the optical access to the trapped atoms and precludes trapping of D due to high recombination rates on superfluid He films. We have built an apparatus that will use the technique of buffer gas cooling to thermalize 1 μ_B atoms. Ablation of a solid LiH(LiD) target will produce atomic Li and H(D). Initial thermalization will be achieved through elastic collisions with a ^{3}He buffer gas at $\sim$350mK. The large Li-H elastic scattering cross section will enhance evaporative cooling of the H atoms. As a first step in this process, we are currently optimizing the system for trapping and cooling of atomic ^{7}Li.

Bonna Newman

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