Combining Yb and Li: Rapid Quantum Degenerate Gas Production and Interacting Mixtures

ALAINA GREEN, RICHARD ROY, RYAN BOWLER, SUBHADEEP GUPTA, University of Washington — We detail a readily adaptable method for optimizing evaporative cooling efficiency in optical dipole traps (ODTs), reducing the production time of quantum degenerate gases. Utilizing the time-averaged ‘painting’ potential of a rapidly moving laser beam, we dynamically shape the trap over the course of evaporation to produce $^{174}$Yb Bose-Einstein condensates of $(0.5-1.0) \times 10^5$ atoms in (1.6-1.8) seconds.\(^1\) We also report on interaction studies in the quantum degenerate Bose-Fermi $^{174}$Yb-$^6$Li mixture in the BEC-BCS crossover. Additionally, we present work on photoassociation spectroscopy on $^6$Li-Yb mixtures and the production of YbLi* molecules in a dual magneto-optical trap, a first step toward coherent production of ultracold $^2\Sigma$ molecules.


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