## Abstract Submitted for the DAMOP16 Meeting of The American Physical Society

Progress towards isotope-dependent trapping of strontium ROGER DING, FRANCISCO CAMARGO, JOSEPH D. WHALEN, Rice University, GERMANO WOEHL JR., Instituto de Estudos Avancados (IEAv), F. BARRY DUNNING, THOMAS C. KILLIAN, Rice University — Independently controllable trapping potentials for different atomic elements, isotopes, and states are useful for forming quantum degenerate gases through sympathetic cooling, for quantum computing architectures<sup>2</sup>, and for fundamental studies in many-body physics<sup>3</sup>. In strontium, the large isotope shifts ( $\sim 100~\text{MHz}$ ) relative to the narrow  $^1\text{SO}\textsc{-3P1}$  intercombination line (7.5 kHz) offers the possibility of creating multi-isotope optical traps in which the potentials are optimized for each individual species, such as  $^{86}\text{Sr}$  with  $^{87}\text{Sr}$  or  $^{86}\text{Sr}$  with  $^{88}\text{Sr}$ , allowing for efficient evaporative cooling. We will present results for confinement of  $^{84}\text{Sr}$  when a dimple is created using far-detuned 689 nm light ( $\Gamma/\Delta \sim 10^{-5}$ ) within a large-volume 1064 nm dipole trap ( $\Gamma/\Delta \sim 10^{-7}$ ). The 689 nm dimple will be used to develop a trap for efficient creation of  $^{88}\text{Sr}$  Bose-Einstein condensates, overcoming the slow evaporation currently required.

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<sup>&</sup>lt;sup>2</sup>Anderlini et al., Nature 448, 452-456 (2007)

<sup>&</sup>lt;sup>3</sup>Mandel et al., Phys. Rev. Lett. 91, 010407 (2003)