

Abstract Submitted
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Enhanced ground-Rydberg coherence times in a state-insensitive optical lattice¹ JACOB LAMPEN, HUY NGUYEN, MATTHEW WINCHESTER, LIN LI, PAUL BERMAN, ALEX KUZMICH, University of Michigan — By confining Rb atoms in a state-insensitive optical lattice, the lifetime of the 5s-ns coherence is increased to $\sim 20 \mu\text{s}$, an order of magnitude improvement on prior demonstrations using untrapped atoms. The enhanced lifetimes open new opportunities for high-resolution spectroscopy and quantum information science. As the first demonstration of their utility, the magic values for lattice frequencies are measured and used to extract the 6p-ns reduced electric dipole matrix elements. Good agreement is found with values obtained by numerical integration for an effective one-electron potential for principal quantum numbers n between 30 and 65.

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