

Abstract Submitted
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Designing Ratchets in Ultra-cold Atoms for the Advanced Undergraduate Laboratory¹ ANDREW HACHTEL, MATTHEW GILLETTE, ETHAN CLEMENTS, SHAN ZHONG, REY DUCAY, SAMIR BALI, Miami University — We propose to perform ratchet experiments in cold Rubidium atoms using state-of-the-art home-built tapered amplifier and imaging systems. Our tapered amplifier system amplifies the output from home-built external cavity tunable diode lasers up to a factor 100 and costs less than \$5,000, in contrast to commercial tapered amplifier systems, which cost upward of \$20,000. We have developed an imaging system with LabVIEW integration, which allows for approximately 2 millisecond exposures and microsecond control of experimental parameters. Our imaging system also costs less than \$5,000 in comparison to commercial options, which cost between \$40-50,000. Progress toward implementation of a one-dimensional rocking ratchet is described.

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