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Precision Excited State Lifetime Measurements for Atomic Parity Violation and Atomic Clocks JERRY SELL, BRIAN PATTERSON, ALINA GEARBA, JEREMY SNELL, RANDY KNIZE, United States Air Force Academy — Measurements of excited state atomic lifetimes provide a valuable test of atomic theory, allowing comparisons between experimental and theoretical transition dipole matrix elements. Such tests are important in Rb and Cs, where atomic parity violating experiments have been performed or proposed, and where atomic structure calculations are required to properly interpret the parity violating effect. In optical lattice clocks, precision lifetime measurements can aid in reducing the uncertainty of frequency shifts due to the surrounding blackbody radiation field. We will present our technique for precisely measuring excited state lifetimes which employs mode-locked ultrafast lasers interacting with two counter-propagating atomic beams. This method allows the timing in the experiment to be based on the inherent timing stability of mode-locked lasers, while counter-propagating atomic beams provides cancellation of systematic errors due to atomic motion to first order. Our current progress measuring Rb excited state lifetimes will be presented along with future planned measurements in Yb.

Jerry Sell
United States Air Force Academy

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