Abstract Submitted
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Precision measurements of excited state atomic lifetimes using a combination of continuous and ultrafast lasers[1] JERRY SELL, BRIAN PATTERSON, ALINA GEARBA, RANDY KNIZE, U.S. Air Force Academy, STEPHEN SPICKLEMIRE, University of Indianapolis — Atomic dipole matrix elements can be determined with high precision by measuring the corresponding excited state atomic lifetime. Measurements in Rb and Cs are important as they provide a test of atomic structure calculations, which are needed to properly interpret atomic parity violating experiments. Optical lattice atomic clocks can also benefit from these measurements as atomic dipole matrix elements play a role in correcting for the frequency shifts due to blackbody radiation. We will present our technique for precisely measuring the excited state lifetime of the Rb $5P_{3/2}$ state, which employs a combination of continuous and ultrafast lasers interacting with counter-propagating atomic beams. This arrangement produces a large signal with small noise, while seeking to minimize various systematic effects such as quantum beating, effects from atomic motion, and radiation trapping. We will present the level of precision in our current measurements in Rb, along with discussing future measurements in Yb and Sr.

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