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Precision Lifetime Measurement of the Cesium $6P_{3/2}$ State JERRY SELL, AUSTIN BERGSTROM, BRIAN PATTERSON, RANDY KNIZE, United States Air Force Academy, THOMAS EHRENREICH, Nufern — We will report a precision measurement of the cesium $6P_{3/2}$ atomic state lifetime using a refinement of our lifetime measurement technique.[1] Initially a single pulse ($\sim$ nJ) is selected from a mode-locked Ti:Sapphire laser which excites cesium atoms in counter-propagating thermal beams to the $6P_{3/2}$ state. A subsequent laser pulse is amplified in a regenerative amplifier ($\sim$ μJ) and also frequency doubled, resulting in pulses which nonresonantly ionize the cesium atoms if they have been excited to the $6P_{3/2}$ state. The ions are collected and counted while varying the delay between the excitation and ionization pulses allowing us to measure the excited state lifetime. We will also address the dominant systematic errors which include: effects from the misalignment of the excitation and ionization laser beams, imperfect extinction ratio of the electro-optic modulators used for pulse selection, and the effect of quantum beats. Finally we consider extending these lifetime measurements to different cesium states and different atoms.

[1]B.M. Patterson, C.D. Lindstrom, T. Takekoshi, J.R. Lowell, C. Villarreal, and R.J. Knize, Opt. Lett. **28** (19), 1814 (2003).

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