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Measurement of Population Dynamics in STIRAP M.A. GEARBA, Department of Physics and Astronomy, University of Southern Mississippi, Hattiesburg, MS 39406, M.L. TRACHY, G. VESHAPIDZE, M.H. SHAH, J. R. Macdonald Laboratory, Kansas State University, Manhattan, KS 66506, H.A. CAMP, Institute for Defense Analyses, Alexandria, VA 22311, H.U. JANG, B.D. DEPAOLA, J. R. Macdonald Laboratory, Kansas State University, Manhattan, KS 66506 — A tremendous amount of work, both theoretical and experimental, has recently been invested in finding efficient coherent excitation techniques to control the population transfer between specified energy states. Measuring the population changes in real time and probing all levels involved during coherent excitation are some of the challenges that most experiments have had to face. Our experiment overcomes these difficulties by employing a modern diagnostic technique, known as Magneto-Optical Trap Recoil Ion Momentum Spectroscopy (MOTRIMS), which makes use of an ion beam as a non-intrusive probe of a three-level rubidium ladder system, coherently excited via the standard STIRAP (stimulated Raman adiabatic passage) method. Several cases are investigated, in which the temporal delay between the two laser pulses is varied, ranging from the so-called counter-intuitive order to the intuitive order. The population dynamics of all three levels involved in the STIRAP process is measured with a resolution of a few nanoseconds. Experimental results are compared with predictions of theory.

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