

Abstract Submitted  
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**STIRAP on sodium vapor with picosecond pulses: calculations and experiment** J. BRUCE JOHNSON, CHAKREE TANJAROON, Arkansas State University, JIM L. HICKS, Northeastern State University, SUSAN D. ALLEN, Arkansas State University — Calculations of STIRAP transfer efficiencies were made on sodium starting from the eight hyperfine states of the 3s ( $^2S_{1/2}$ ) electronic ground state, passing through the eight hyperfine states of the 3p ( $^2P_{1/2}$ ) and/or fourteen of the sixteen hyperfine states of the 3p ( $^2P_{3/2}$ ) to the eight hyperfine states of the 5s ( $^2S_{1/2}$ ) state. Linearly polarized light was used in calculations and experiment leading to six independent sets of coupled states (four sets of five states and two sets of nine states). Calculations were made for laser pulses several picoseconds in length and compared with experiment. Although the linewidth of the laser pulses used in both computation and experiment was a small fraction of the fine structure splitting between the 3p states, both fine-structure states were observed to contribute to the STIRAP transfer efficiency. A rich set of results was found including oscillations similar to the Rabi oscillations observed in two-state systems when the pump and Stokes pulses were tuned to wavelengths between the two 3p states.

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