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Picosecond STIRAP on sodium vapor in a noble gas buffer JIM L. HICKS, CHAKREE TANJAROON, SUSAN D. ALLEN, JOEY BURDIN, STEVEN HOKE, J. BRUCE JOHNSON, Arkansas State University — Stimulated Raman adiabatic passage (STIRAP) and stimulated emission pumping (SEP) measurements were made on sodium vapor as a function of buffer gas pressure for several noble gases. The transitions used for the pump and Stokes pulses were $3p (^2P_{1/2}) \leftarrow 3s (^2S_{1/2})$ and $5s (^2S_{1/2}) \leftarrow 3p (^2P_{1/2})$ respectively. The laser pulses were approximately 12 ps long and were near-Fourier-transform-limited. When pump and Stokes pulse energies were well above the minimum required for efficient STIRAP transfer, an increase in buffer gas pressure first increases and then decreases the STIRAP and SEP efficiencies. The dependence of the peak efficiency position is presented as a function of the sodium temperature, laser pulse energy, and the buffer gas that was used. The maximum in the STIRAP efficiency occurred at pump and Stokes wavelengths that were shifted relative to the optimum wavelengths in the SEP regime.

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