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Planned Efficiency Measurements of STIRAP¹ VLADISLAV ZAKHAROV, CASEY MCKENNA, DEQIAN YUAN, JESSICA GASPARIK, HAROLD METCALF, Stony Brook University — Our measurements of the absolute efficiency of using STIRAP to populate Rydberg states of He have been limited by the Doppler detuning associated with the divergence of the atomic beam that crosses perpendicular to our laser beams. The limitation is exacerbated when both laser beams co-propagate, compounding these Doppler shifts. We plan to have them counter-propagate and thereby ameliorate this effect. He 2^3S atoms in a LN_2 temperature thermal beam are coupled to the 3^3P state by $\lambda=389$ nm light (blue), and that state is coupled to Rydberg states by ~ 800 nm (red) light. The anti-parallel laser beams are arranged so that the atoms encounter the red light first (counter-intuitive order for STIRAP) partially overlapping with the blue. We have observed interference among the atomic transitions by varying the light polarization,² and are planning further studies concerning these internal atomic interferometry phenomena.

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²Yuan Sun. PhD thesis, Stony Brook, 2013.

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