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Collimated Blue and Infrared Beams Generated by Two-Photon Excitation in Rubidium Vapor ALINA GEARBA, JERRY SELL, ROBERT OLESEN, RANDY KNIZE, United States Air Force Academy — Utilizing nonlinear optical processes in Rb vapor we describe the generation of optical fields at 420 nm, 1.32 μm, and 1.37 μm. Input laser beams at 780 nm and 776 nm enter a heated Rb vapor cell collinear and circularly polarized. Rubidium atoms are excited to the $5D_{5/2}$ state, with blue light generated by four-wave mixing through the $6P_{3/2} \rightarrow 5S_{1/2}$ states, while infrared beams at 1.37 μm and 1.32 μm are generated by cascading decays through the $6S_{1/2} \rightarrow 5P_{3/2}$ and $6S_{1/2} \rightarrow 5P_{1/2}$ states, respectively. While the blue beam emission from four-wave mixing has been studied in detail, the mechanisms responsible for generating the infrared beams are still under investigation. We will present our results for the conditions which give rise to infrared beam generation by two-photon excitation in rubidium vapor.

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