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Blue (420 nm) and Infrared (1324 nm) Coherent Beams Generated by Multiple Wave Mixing in Rb Vapor R.J. KNIZE, J.F. SELL, United States Air Force Academy, M.A. GEARBA, University of Southern Mississippi — Utilizing nonlinear optical processes in Rb vapor we describe the generation of coherent optical fields at 420 nm and 1324 nm. 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 cascading decays through the $6P_{3/2} \rightarrow 5S_{1/2}$ and $6S_{1/2} \rightarrow 5P_{1/2}$ states producing blue (420 nm) and IR (1324 nm) beams, respectively. Scaling the input 780 nm and 776 nm laser powers to $\geq$ 200mW we obtain a coherent blue beam of 9 mW power, almost an order of magnitude larger than previously achieved. An IR beam of $\leq$ 3 mW is also produced and we describe the dependencies of both beams in relation to the Rb density, the frequency detuning between Rb ground state hyperfine levels, and the input laser intensities.

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