Abstract Submitted
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Nonlinear Optics: Efficient Second Harmonic Generation and Difference Frequency Generation[1] DAVID MARVIN, ALI KHADEMIAN, DAVID SHINER, University of North Texas — Second Harmonic Generation is a well-known phenomenon caused by polarized light passing through a crystal with nonlinear optical properties. The crystal's nonlinear polarizability will cause the formation of a second wave of light that has a frequency which is double that of the incident light. This effect also leads to frequency mixing, in which for instance two lasers of different frequencies can combine to create a sum or difference frequency, which is useful, for example, in the creation of more broadly tunable laser sources. However, with the power levels commonly available in continuous wave laser sources ($\sim$ 1 W), the nonlinear polarizability produces a small effect; only a small amount of the source light is converted into second harmonic light. Several techniques can be used to amplify the effect in order to obtain a useful amount of frequency converted light. We are using a commercially available Periodically Poled Lithium Niobate (PPLN) crystal in a waveguide configuration, along with efficient mode matching, in an effort to produce a potentially efficient, tunable frequency mixing system. Current results (60% mode coupling and 300%/W/cm) and future directions will be presented.

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