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Blue light generation using periodically poled nonlinear crystals[1]
ALI KHADEMIAN, University of North Texas, DAVID SHINER, University of North Teaxs — We have studied blue light generation using SHG of IR light. We have used single pass waveguides and bulk crystals with buildup cavities. The nonlinear crystals used were periodically poled Lithium Niobate (LN) [1] and Potassium Titanyl Phosphate (KTP) [2]. Each of these approaches had limitations with regards to the maximum power handling and the stability of operation. Currently we are working on a different crystal in a new buildup cavity to circumvent some of the previous difficulties resulting from photorefractive damage and excessive heating due to blue absorption. Our initial measurements show that Lithium Tantalite (LT) has higher photorefractive threshold and much lower blue absorption (2% vs 15% for 20 mm crystal length). The new buildup cavity incorporates a more convenient commercial piezo mirror translator for feedback control. The buildup cavity can be operated with a minimum of 6 V as opposed to the 1000 V previously. We are exploring the use of a single DSP (digital signal processor) to perform all the locking and electronic control functions of the cavity. We are studying the coupling and propagation properties of the IR beams more carefully to minimize cavity and coupling losses, particularly due to front wave distortion caused by mirrors and lenses used in the setup. To optimize our cavity and to make the best and simplest choice of optical elements possible, different commercial (off the shelf) lenses and mirrors have been evaluated experimentally in our setup. [1] Koustrubh Danekar, Ali Khademian, and David Shiner, Opt. Lett. 36, 2940 (2011), [2] Ali Khademian and David Shiner, JWA33, CLEO (2007)

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