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Approach to a convenient and efficient CW laser for UV spectroscopy at 243 nm ALI KHADEMIAN, DAVID SHINER, University of North Texas — Second harmonic generation (SHG) is one approach for generating a single frequency UV light source for various applications, including spectroscopy. We use a reliable and stable near IR diode laser and a periodically poled crystal in a convenient doubling cavity to generated single frequency blue at 486 nm (with 500 mW power). This provides the fundamental source for generating UV. We implemented improvements for controlling and locking our blue laser source and to allow tests of crystal lifetime. To extend this source to the UV, two methods for SHG are investigated. The first is ordinary phase matching, with drawbacks, such as walk-off and the need for dichroic coatings for separating the fundamental blue from generated UV. The second is quasi phase–matching (QPM), which conveniently separates the blue and UV using a Brewster cut nonlinear crystal. Unfortunately the required first order periodically poled period is shorter than currently achievable. Third order QPM is thus required, which reduces the single pass efficiency by a factor of 9. We discuss these two possibilities for UV generation, including the choice of nonlinear crystals, the techniques for separating UV from blue, the anticipated theoretical efficiency and UV power scale, and the status of our efforts.

Ali Khademian
University of North Texas

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