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**Developing convenient fiber and solid state laser sources for use in atomic physics**[1] ALI KHADEMIAN, University of North Texas, RONNIE CURREY, MATTHEW TRUSCOTT, DAVID SHINER, Univ of North Texas — The evolution of rare-earth doped fiber lasers has had an impact on developing convenient laser sources. These sources can provide high power single transverse modes with near Gaussian beam shape from single mode fibers. We have been interested in developing Thulium (Tm) doped fiber lasers designed for operation at 2058 nm and Ytterbium (Yt) doped fiber lasers at 1083 nm for studying the helium atom. Fiber lasers are typically pumped by very reliable and low cost high power fiber coupled solid state lasers operating at 920, 975 and 793 nm. The technology of fiber Bragg gratings (FBG) provides laser cavities inside fiber glass with minimum cavity loss that is a critical factor for efficiency. We will discuss the current status of our 2058 nm source made of Tm fiber with an output power of 2 W, which is used for quenching singlet helium atoms in our apparatus. Nonlinear wavelength conversion also provides us the opportunity to develop custom laser sources that cover spectral regions otherwise not readily available. We will discuss the current status of a single frequency blue laser at 486 nm with output power of 500 mW by second harmonic generation (SHG) from IR. This laser also could be used as a fundamental laser source for an additional SHG stage to generate UV such as 243 nm for study of hydrogen like atoms. We will discuss our approaches for using a number of BBO crystals in series which are bounded by adhesive free technology. This improves the conversion efficiency as well as beam quality of the generated UV at 243 nm.

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