

iodine-loaded hollow-core photonic crystal fiber [18]. The combination of the coin-sized laser module and the hollow-core photonic crystal fiber could be used to form an ultra compact iodine-stabilized laser. We note that with the new laser, wavelength conversion, and iodine devices, it is also attractive to investigate iodine transitions at other wavelengths [33].

In most interferometric measurements, the measurement uncertainty is limited at a level of 10^{-9} by the refractive index of air. Therefore, our compact laser can be used for various interferometric applications including the measurement of gauge blocks [12]. In the gauge block measurement, an uncertainty arises from the frequency modulation of a light source [12]. Therefore, we need to investigate the effect of the modulation frequency and width employed in the present work on the measurement precision of gauge blocks. Such experiments are now under way. More applications of our compact laser include the calibration of a wavelength meter, a laser gravimeter, and as an absolute frequency marker for an astro-comb [34]. For a wavelength meter, calibration is periodically needed, since its reading drifts due to variations in environmental temperature and pressure. For calibration purposes, a simple and low-cost laser with an accurate absolute frequency is suitable. While iodine-stabilized He-Ne lasers at 633 nm are widely used in absolute ballistic gravimeters, iodine-stabilized Nd:YAG lasers are also used for this application (e.g, see Ref. [35]). It is important to construct a compact laser system, since the measurement of the gravity is usually carried out in a severe environment. The frequency stability of the laser used in Ref. [35] is at the 10^{-10} level, and thus our compact laser can be used for this application. An astro-comb has recently been demonstrated for the calibration of an astronomical telescope [34]. In this scheme, a frequency-stabilized laser is needed to identify the mode number of the comb. The laser must have a frequency accuracy of better than the repetition rate of the comb and be compact and robust enough for installation in an astronomical observatory.

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