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Frequency and Intensity Stabilization of Planar Waveguide-External Cavity Lasers

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University of Texas at Brownsville — Planar Waveguide External Cavity Lasers (PW-ECL) show an immense potential for use in precision measurement tasks and space missions because of its compactness and simple design. We show the techniques used to frequency and intensity stabilize a PW-ECL 1550nm laser system with the goal of achieving a frequency stability of $30 \text{ Hz}/\sqrt{\text{Hz}}$ and a RIN of less than 10^{-6} . These PW-ECL systems are a potential replacement for Non-Planar Ring Oscillator (NPRO) laser systems, which have become a standard for low-noise interferometric applications, if the PW-ECL can meet the required stability. We present the initial experimental results of the intensity and frequency stabilization setup and we show a comparison between PW-ECL lasers and NPRO lasers with respect to measurements and applications requiring a high frequency and intensity stability.

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