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A stable 657nm laser for a Ca atom interferometer BRIAN NEYENHUIS, CHRISTOPHER ERICKSON, REBECCA TANG, GREG DOERMANN, MARSHALL VAN ZIJLL, DALLIN DURFEE, Brigham Young University — We will present an extremely stable laser to be used in an atom interferometer. A 657nm grating-stabilized diode laser is locked to a high-finesse cavity using the Pound-Drever-Hall method. Utilizing a feedback circuit with a bandwidth of 5 MHz we see a laser linewidth less than one kHz. In addition to a relatively high bandwidth, our circuit design allows for mode-hop-free scanning over a large range. We are also working on several improvements which should further reduce our linewidth; we are improving passive mechanical and thermal stability of the laser and the optical cavity and plan to change to a higher finesse cavity, we have designed and are testing a more stable current driver based on an updated Hall-Libbrecht design, and we calculating an optimized multiple-input feedback transfer function for our system. We will also present the measurement of the resonances of our optical cavity relative to the Ca intercombination line using a high-temperature vapor cell.

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