Prism-based Cr:forsterite laser frequency comb stabilization and carrier-envelope offset frequency linewidth narrowing. RAJESH THAPA, KARL TILLMAN, KEVIN KNABE, ANDREW JONES, BRIAN WASHBURN, KRISTAN CORWIN, Kansas State University — Infrared frequency combs in the near IR, based on lasers such as Cr:forsterite, are important for frequency measurements in the telecommunications band. We have actively stabilized a self-referenced prism-based Cr:forsterite frequency comb using both prism and power control inside the cavity. We also report dramatic reduction in the linewidth of the carrier envelope offset frequency ($f_0$) by at least two orders of magnitude simply by inserting a knife edge into the laser cavity after the prisms. We have stabilized the laser when the $f_0$ beat width was both wide ($\sim 1.5$ MHz) and narrow ($\sim 10$ kHz) although the locking was less robust with the narrower beat note. We measured the fractional stability of the comb by counting the repetition frequency ($f_r$) and $f_0$. The fractional stability of the comb at 10 s was limited by the frequency counter resolution to $<10^{-12}$. An optical characterization of the stability is in progress. Furthermore, we will use this comb to characterize optical frequency references based on acetylene-filled hollow photonic band gap optical fibers.

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