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Phase Stabilization of a Modelocked Ti:sapphire Laser T.J. HAMMOND, JIE JIANG, DAVID JONES, Dept of Physics and Astronomy, UBC — The frequency stabilization of pulsed, mode-locked lasers has lead to an entirely new set of experimental capabilities (Jones et al, Science 2000; Diddams et al, Science 2001). When stabilized, the laser spectrum consists of a set of well-defined modes, collectively known as a frequency comb. In order to implement phase stabilization of a femtosecond mode-locked laser, an octave of bandwidth is required (Fortier et al, Opt Lett 2003). We have constructed a laser that directly generates this necessary octave. This poster will present the setup of an octave spanning Ti:sapphire femtosecond laser and the frequency locking scheme. By frequency doubling the low end of the spectrum and optically heterodyning it with frequencies at the high end, we are able to derive the offset frequency and stabilize the frequency comb in an absolute sense. Once stabilized in this manner, the comb can be used as a ruler for optical frequency measurements. We will discuss the future plans involving the use of our stabilized frequency comb as a spectroscopic tool for investigations into cold atom dynamics.

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