

Abstract

The Research and Development division requires a mode locked laser with pulse lengths on the order of 100 fs to sync with RF cavity pulses. The 1550 nm MENLO laser system originally meant for the work has obtained pulse lengths on the order of $\sim 10 \mu\text{s}$, orders of magnitude longer than desired. This project was designed with the goal in mind of fabricating the division's own 1550 nm mode-locked laser utilizing erbium-doped fiber as a gain medium in a fiber laser cavity. Erbium is a key choice due to the reduced cost of fiber from the telecommunications industry as well as the fact that it emits light at the desired wavelength of 1550 nm. This laser was fabricated in a stepwise fashion by installing, testing and modifying key parts until they met desired specifications. At optimal settings, pulse widths of less than 400 fs can be achieved, and future plans for the system focus on further modification of the laser setup so that smaller pulse widths can be achieved.