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Simple Dye Laser Based on a Tapered Optical Nanofiber ASIA AYANYEMI, PHILIP RICH, RAJANI AYACHITULA, RANDY KNIZE, BRIAN PATTERSON, U. S. Air Force Academy — Tapered optical nanofibers are an interesting area of physics research. The evanescent field surrounding the taper region can be used to create atom traps, inertial sensors, novel lasers, and other physical applications. Of these, we have chosen to focus on using a tapered optical fiber to create a simple dye laser. Light from a 520-nm diode laser is launched into a single-mode fiber. The fiber is adiabatically tapered to approximately 1 micrometer and placed in rhodamine 6G laser dye. The pump light interacts with the dye gain medium through the external evanescent field causing stimulated emission, which couples back into the fiber. Mirrors on each end of the fiber provide necessary feedback for lasing, and a grating is used to tune the broad spectral output. We characterize the lasing threshold and output spectrum of the laser. This has been a good project for undergraduate students to learn about lasers and optics.

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