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Testing Fiber Tips for Use in Tip-Enhanced Raman Spectroscopy[1] BRYNNA NEFF, KHANT MINN, BLAKE BIRMINGHAM, ZACK LIEGE, HOWARD LEE, ZHENRONG ZHANG, Department of Physics, Baylor University — Tip-enhanced Raman spectroscopy (TERS) is a useful technique for chemical imaging of a sample. We aim to improve this technique by using optical fiber tips to perform TERS within a scanning tunneling microscope (STM). In this setup, the electromagnetic signal is carried along the fiber, eliminating the need for a complicated optical alignment. This project focused on producing fiber tips and testing their optical properties. To test the light collection of the fiber, we focused a supercontinuum laser onto a prism, and collected the light through a fiber approached to the back side of the prism where the laser was reflected. We found that as we changed the polarization of the incoming light, the relative intensities of the spectral peaks changed. We also tested the emission of light through the fiber by coupling the laser to the fiber core and taking optical images of the light emitted from the tip. We found that the light emission from the fiber is partially polarized along the tip axis. By putting various molecules on the fiber tip and measuring the reflected signal, we were able to get a strong Raman signal of CuPc. The optical properties of these fiber tips show the feasibility of the new scheme.

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