Matthew Sonntag (Chemistry)

“Light Guidance in the Nanoscale: Enhanced Spectroscopy”

Considerable progress has been made in achieving dramatic localization of light below the diffraction limit. This localization has broad impacts on a variety of applications such as sensing, spectroscopy, and molecular electronics. We utilize the Finite Difference Time Domain Method (FDTD) to simulate the interaction of electromagnetic energy with metal nanostructures. The resulting enhanced fields can lead to detection of down to single molecules. Here I present my research discussing methods to focus the electromagnetic fields near the tips of metal nanostructures. Additionally, a discussion of what metals possess the most promising characteristics for enhancing the local fields will be presented. I explain the use of these results to further experimental work with respect to enhanced Raman spectroscopy.