XUV frequency combs for precision spectroscopy

Name/Contact of Project: R. Jason Jones, Ph.D.

Project Description: We are currently exploring precision frequency comb spectroscopy of atomic and molecular transitions in the vacuum-ultraviolet (VUV) and extreme ultraviolet (XUV) that have significant value in increasing our understanding of atomic and molecular transitions in this spectral region. A new method utilizing two fs frequency combs (mode-locked lasers) will be investigated as a promising path towards high-resolution spectroscopy in this difficult to reach spectral region. The project will provide unique hands-on opportunities for undergraduate students in the fundamentals of advanced laser systems, electronic stabilization techniques, vacuum technology, and nonlinear optics.

Required Skills: Some basic experience in working with optical components and laser systems.

Ideal Skills: An undergraduate course in optics and/or lasers, as well as in simple electronic circuits would be beneficial for this research. Past experience building simple electronic circuits, computer interfacing with instruments, machine shop experience with basic mill/lathe, and or working with resonant optical cavities (e.g. Fabry-Perot cavity, laser cavity) would beneficial.