PHYSICS

CONDENSED MATTER PHYSICS SEMINAR SERIES

4:00 pm - Rm 184 NSH

Thursday, October 17

Prof. David Burghoff

Department of Electrical Engineering
University of Notre Dame

Frequency combs based on quantum cascade lasers and microresonators

Frequency combs are light sources whose lines are perfectly evenly-spaced. The phase coherence of these sources allows them to be used in a number of applications, ranging from dual-comb spectroscopy to precision time and distance measurements. Traditionally these combs were based on mode-locked lasers, but more recent developments in nonlinear optics have led to the creation of compact combs based on quantum cascade lasers and on microresonators. I will discuss the physics of these devices and on my group's work on quantum cascade laser combs at terahertz wavelengths, as well as the computational techniques that have been developed to study their physics and to perform spectroscopy with them.

BIO:

David Burghoff is an Assistant Professor in the Department of Electrical Engineering at Notre Dame, having begun his position in 2018 after doing his doctoral and postdoctoral work at MIT. His group, the Quantum and Nonlinear Optoelectronics Group, uses nanoscale engineering to push beyond the limits of conventional electronics and photonics, engineers new coherent processes to make devices that utilize the entire electromagnetic spectrum, and seeks to use newly-discovered phenomena to create devices that address the world's key challenges. His awards include the 2019 AFOSR Young Investigator Program award, MIT's J.A. Kong Best Electrical Engineering Ph.D. Thesis award, and the Intelligence Community Postdoctoral Fellowship.