3D Nanogap Cavities for Extreme Light-Matter Behavior

Maiken H. Mikkelsen
Department of Electrical and Computer Engineering, Duke University

Abstract:

In this talk, I will discuss how 3D nanogap cavities can realize "Extreme Nanophotonics", where electromagnetic fields are sculpted on the atomic- or molecular- scale. Such precise control of local electromagnetic fields enables previously inaccessible material properties and behavior to be revealed. A variety of recent examples will be reviewed from high-speed thermal photodetectors with on-chip spectral filters (*Nature Materials 19, 158 2020*) to potential for optical communications (*Optica 8, 202 2021*) and metasurface-enhanced biosensors (*Nano Letters 6, 4330 2020*).

Bio:
Maiken H. Mikkelsen is the James N. and Elizabeth H. Barton Associate Professor at Duke University in the Department of Electrical & Computer Engineering, and by courtesy, in the Departments of Physics and Mechanical Engineering & Materials Science. She received her B.S. in Physics from the University of Copenhagen in 2004, her Ph.D. in Physics from the University of California, Santa Barbara in 2009 and was a postdoctoral fellow at the University of California, Berkeley before joining Duke University in 2012. Her research explores nanophotonics and new quantum materials to enable transformative breakthroughs for optoelectronics, quantum science, the environment and human health. Her awards include the Maria Goeppert Mayer Award from the American Physical Society, the NSF CAREER award, the Moore Inventor Fellow award from the Gordon and Betty Moore Foundation and Young Investigator Program Awards from the Office of Naval Research, the Army Research Office and the Air Force Office of Scientific Research.