



23rd July 2018 - 11:00 a.m.

CFEL-bldg. 99, seminar room IV (O1.111)

Phillip Donald Keathley

Massachusetts Institute of Technology, Cambridge, USA

**Science and applications of nanoscale
optical-field-driven electron emitters**

Nanoscale devices can enhance the electric field of ultrafast optical pulses such that optical-field emission (*i.e.* optical tunneling) is achieved before the onset of damage or unwanted thermal effects. This enables a new class of electron emitter devices for ultrafast microscopy and optical metrology with nanometer spatial and attosecond temporal resolution.

In this talk, our latest developments in exploring the science of optical field emission from nano-emitters are presented. This includes the observation of channel-closures in the transition from multiphoton to optical-field emission from silicon nanotips, and the imprint of sub-optical-cycle, sub-fs field-emission from plasmonic nanoantennas.

Application areas that are being explored, are also highlighted, including on-chip carrier-envelope phase monitoring and shot-to-shot tagging, as well as structured, ultrafast photocathodes.