

# Lighting Up Tightly Confined Photon Modes with Focused Electron Beams

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## **Abstract:**

Plasmon enhanced photon absorption and emission in nanostructures plays an important role in many applications such as nanoantennas and nanolasers. In this talk, I will discuss our development of optical and electron probes for investigation of plasmonic nanostructures. In particular, the dark modes with “forbidden” photon transitions in subwavelength nanocavities are of great interest, as they promise energy conversion with high quantum efficiency. Using a focused electron beam spot, we selectively excite plasmons from the metallized nanocavities with fine spatial resolution (<20nm) at real-time. The measured high resolution spectrum reveals unexpected high photon counts associated with signatures of the dark modes, in contrast to common wisdom that such dark modes only couple weakly to the far field. I will also discuss the potential application of these plasmonic devices with ultra-small mode volume and high Purcell factors.