

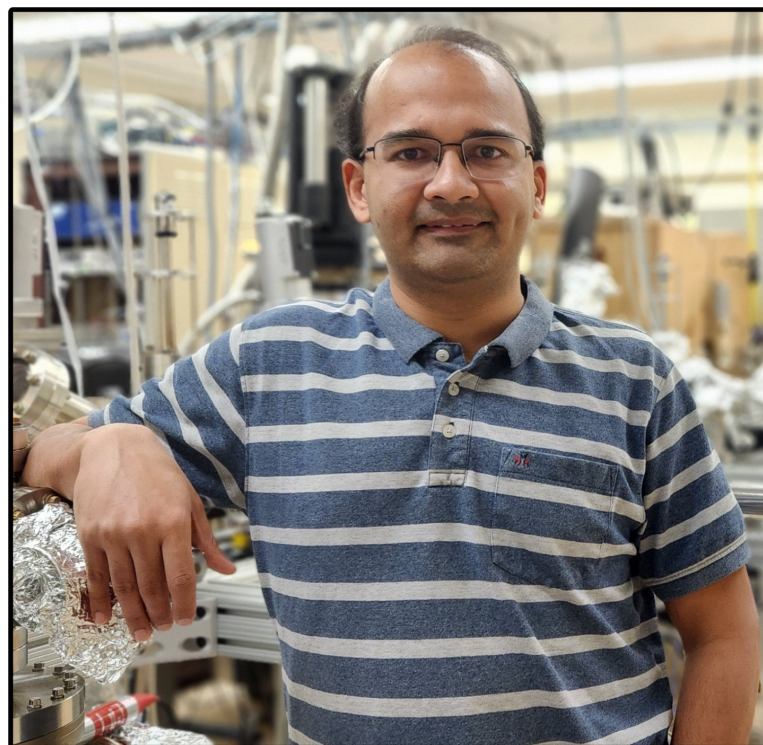
Thursday, September 7, 2023

Refreshments at 3:15pm outside PSF 101
Colloquium from 3:30pm - 4:30pm in PSF 101

Photoemission and Bright Electron Beams

Professor Siddharth Karkare

Arizona State University



Abstract:

Electron beam brightness, or the charge density in the position-momentum phase space, is the critical figure of merit which limits the performance of most pulsed electron beam applications ranging from multi-GeV-km-scale applications like X-ray free electron lasers and particle colliders, to few-100-keV-few-meters-scale applications such as ultrafast electron diffraction, microscopy, and compact x-ray sources.

In this talk I will describe the advances that my research group, the Photoemission and Bright Beams Lab (PBBL), has made in understanding of the photoemission properties of materials and their impact on electron beam brightness. I will present the research that PBBL has done to make advances in cathode materials and how we combined these cathode materials with photonics and plasmonic technologies to achieve orders of magnitude increased brightness that can enable new electron beam applications. Further, I will highlight how the efforts of PBBL for increasing electron beam brightness are resulting in the discovery and investigation of novel regimes and modalities in photoemission physics.

Biography:

Siddharth Karkare joined the Department of Physics at Arizona State University in 2018 as an Assistant Professor, after his postdoc at the Lawrence Berkeley National Laboratory. He obtained his PhD. from Cornell University in 2015. His current research interests are focused on the fundamental physics of photoemission and electron sources with the aim of increasing electron beam brightness for various applications. He holds several leadership roles and accolades in this field, including his role as Thrust lead of the NSF Science and Technology Center for Bright Beams, the Moore Inventor Fellow Finalist award, and the 2020 Department of Energy Early Career Award.

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