



THE UNIVERSITY OF ARIZONA

College of Engineering

Aerospace and Mechanical Engineering Seminar

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Radiative heat transfer between nanostructures: beyond the Blackbody limit

Abstract: Thermal radiation is a ubiquitous physical phenomenon that was central to the development of quantum mechanics over a century ago and today remains essential to a host of important fields ranging from energy conversion to climate science to COVID-19 screening. Despite its importance to our daily lives and rich history of scientific research, thermal radiation is not well understood at the nanoscale – a length scale that is increasingly relevant due to the rapid development of nano- and micro-technologies. In this talk, I will discuss my recent works demonstrating how radiative heat transfer between select nanostructures can be greatly enhanced and actively tuned in ways that are not expected based on the ‘classical’ radiation theory of Max Planck. The ability to control heat transfer by leveraging these nanoscale effects could potentially unlock advances in thermal management of microelectronics, infrared imaging and spectroscopy, and thermal to electric energy conversion. I will end the talk by discussing open questions that continue to drive research in this field, followed by a brief introduction to the specific projects I hope to pursue in the future.

Bio: Dakotah Thompson is an assistant professor in the Mechanical Engineering department at UW-Madison and leads the Thompson Lab for Thermal Metrology of Nanosystems. His research program leverages expertise in calorimetry, low-noise detection schemes, and nanofabrication to probe energy transport and conversion processes at nanometer length scales. In addition to research, Dakotah teaches Elementary Heat Transfer and is developing a graduate course on Measurement Noise & Precision Instrumentation. Dakotah received his B.S. in Mechanical Engineering at Georgia Tech in 2012 and his Ph.D. at the University of Michigan in 2018. For his graduate work on radiative thermal transport, Dakotah was a recipient of the NSF Graduate Research Fellowship and ProQuest Distinguished Dissertation Award.

Thursday, October 22nd at 4:00 pm

Zoom link: [Zoom link](#): Email eperumala@arizona.edu