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Speech subject： Thermal Management of High-Power Electronics: from the Inside Out

Speech leader: *Ronggui YANG,* Chair Professor, Peking University

Speech Description/Objective:

The soaring heat flux density of electronic chips poses unprecedented challenges to thermal management. Our team has conducted research on the multi-physics problems of heat generation, transport and thermal management of electronics. We have developed integrated methods combining first-principles calculations with meso-scale simulations to study heat transport across heterogeneous interfaces. We have proposed techniques such as gradient interface with buffer layers and nanostructured interfaces to reduce interface thermal resistance. Based on ultrafast laser thermal reflection method and supervised machine learning, we have developed high-throughput thermal measurement and imaging tools. New ideas that couple bubbles/droplets with a wicked liquid film has been proposed and demonstrated to enhance phase-change heat transfer, which results in the development of high conductance thermal ground planes.

Speech Outline:

Who Should Attend:

Introduction of Speaker:

Dr. Ronggui Yang is currently a Chair Professor at the School of Engineering, Peking University, jointly with the School of Energy and Power Engineering at Huazhong University of Science and Technology in China. He received his PhD from MIT in 2006 and was a Professor of Mechanical Engineering at the University of Colorado Boulder (2006-2019). His research interests are on the fundamentals of transport phenomena (thermal conduction, thermal radiation, thermoelectrics, liquid-vapor phase-change heat transfer) and the applications of micro/nanotechnologies for thermal, energy, and electronic systems. Dr. Ronggui Yang has published ~ 260 journal papers. His innovative research has won him numerous awards including the 2020 Nukiyama Memorial Award in Thermal Science and Engineering, the 2010 ASME Bergles-Rohsenow Young Investigator Award in Heat Transfer, an NSF CAREER Award in 2009, the MIT Technology Review’s TR35 Award in 2018.