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## Electronic materials reaching out to mechanical, optical and thermal functionalities: physics and applications

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时间：5月22日（星期四）15:00—16:30

地点：北京大学物理大楼中212教室

**吴军桥，** Professor Junqiao Wu received a B.S. from Fudan University and a M.S. from Peking University, China, both in physics. He obtained a Ph.D. degree in applied physics from the University of California, Berkeley for work on nitride semiconductors and highly mismatched semiconductor alloys. He did postdoctoral research in the Department of Chemistry at Harvard University on phase transitions in transition metal oxide nanomaterials. He began his faculty appointment in the Department of Materials Science and Engineering at the University of California, Berkeley in 2006. His honors include the Berkeley Fellowship, the 29th Ross N. Tucker Memorial Award, the Berkeley Presidential Chair Fellowship, the U.S. NSF Career Award, the U.S. DOE Early Career Award, and the U.S. Presidential Early Career Award for Scientists and Engineers (PECASE). He has published more than 100 widely cited papers. The Wu group explores novel properties and applications of strongly correlated electron materials with reduced dimensions, phase transitions at the nanoscale, and optoelectronic, thermal and thermoelectric properties of semiconductor alloys and interfaces. More information can be found at http://mse.berkeley.edu/~jwu.

**Abstract:** Electronic materials are materials in which mobile electrons play an active role in defining their relevant properties. However, their functionalities and applications are not necessarily limited to the electronic sector. In this talk I will discuss our recent efforts in extending our understanding and engineering of electronic materials to fields dominated by mechanical, thermal or optical processes. Specifically, I will highlight three examples: 1) phase transition-driven micro solid engine, where we investigate the thermal behavior of strongly correlated electrons in doped VO2, and utilize it for high-performance micro-actuation; 2) point defects-enhanced thermoelectrics, in whichwe tune the coupling between charge and heat transport in Bi2Te3-Bi2Se3 alloys by controlling their native point defects; and time permitting, 3) molecularly gated luminescence in monolayer semiconductors.

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*Photoed by Xiaodong Hu*