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THz electronics enabled by 2D electron systems

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地点：北京大学物理大楼南506教室

Prof. Huili Grace Xing ， Huili Grace Xing is currently a Professor of Electrical Engineering at the University of Notre Dame. She obtained B.S. in physics from Peking University (1996), M.S. in Material Science from Lehigh University (1998) and Ph.D. in Electrical Engineering from University of California, Santa Barbara (2003), respectively. Her research focuses on development of III-V nitride and 2-D crystal semiconductor growth, electronic and optoelectronic devices, especially the interplay between material properties and device development. More recent research interests include THz applications. She is a recipient of AFOSR Young Investigator Award and NSF CAREER Award.

Abstract ： As the speed of solid-state electronics increases dramatically in the past few decades from MHz to GHz, THz electronics is the natural extension of the pursuit in increasing communication bandwidth and speed. Furthermore, THz electromagnetic waves have also long been touted as a potentially powerful probe to realize non-destructive detection of chemical bonds and material constituents etc. There are various physical phenomena that can lead to realization of THz emitters, detectors, modulators and amplifiers. In this talk, two approaches engaged will be discussed. In one approach, we modulate the THz wave transmission by field-effect controlled intraband transition in 2 dimensional electron systems. In another approach, we aim to excite plasma waves supported in a 2 dimensional electron system to realize power amplification]. A brief discussion on the unique advantages of graphene in internal photoemission (IPE) for characterizing energy band alignment in heterostructures will also be presented.

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Photograph by Xiaodong Hu