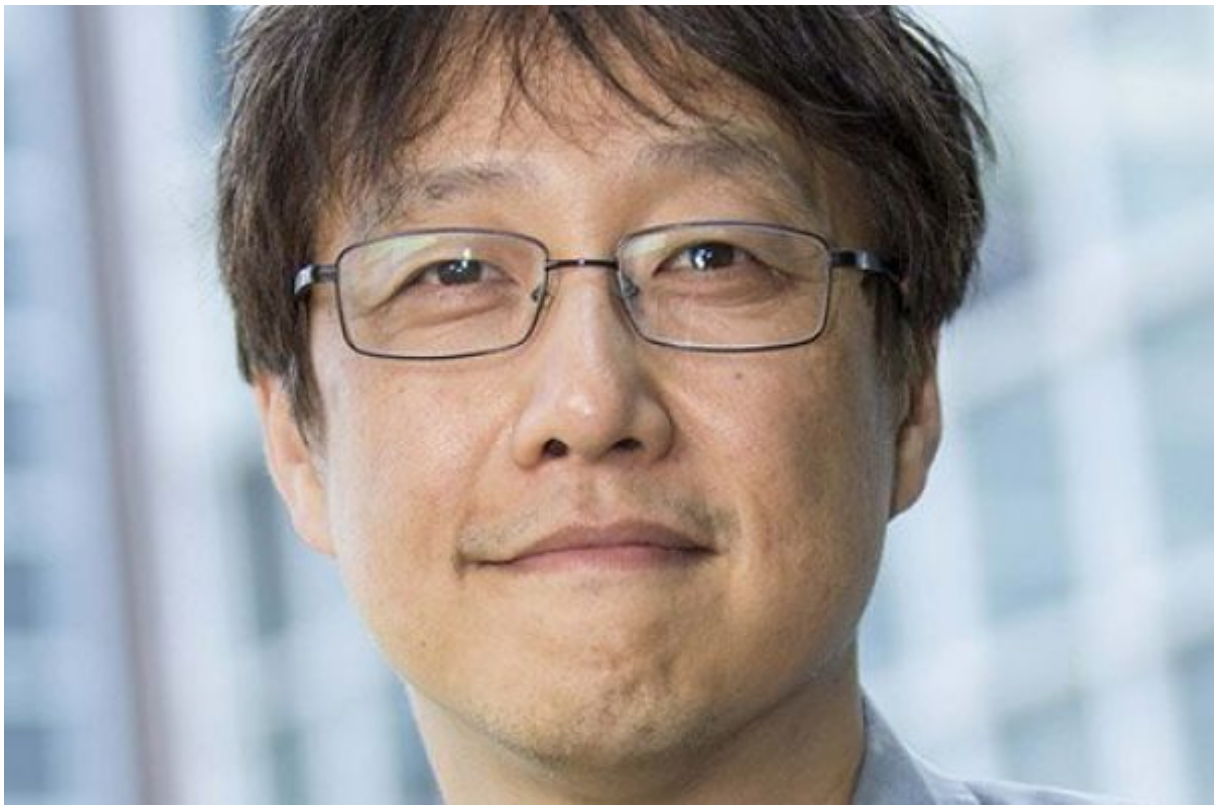


ICFO Colloquium PHILIP KIM 'Materials in 2-Dimension and Beyond: Platform for Novel Electronics and Optoelectronics'

PHILIP KIM

March 30, 2017

Thursday, March 30, 12:00, ICFO Auditorium

PHILIP KIM

Professor of Physics and Applied Physics, Harvard University$$Professor Philip Kim received his B.S in physics at Seoul National University in 1990 and received his Ph. D. in Applied Physics from Harvard University in 1999. He was Miller Postdoctoral Fellow in Physics from University of California, Berkeley during 1999-2001. He then joined in Department of Physics at Columbia University as a faculty member during 2002-2014. Since 2014, he is at Harvard University, where he is Professor of Physics and Professor Applied Physics. Professor Kim is a world leading scientist in the area of materials research. His research area is experimental condensed matter physics with an emphasis on physical properties and applications of

nanoscale low-dimensional materials. The focus of Prof. Kim?s group research is the mesoscopic investigation of transport phenomena, particularly, electric, thermal and thermoelectrical properties of low dimensional nanoscale materials
Heterogeneous interfaces between two dissimilar materials are an essential building block for modern semiconductor devices. The 2-dimensional (2D) van der Waals (vdW) materials and their heterostructures provide a new opportunity to realize atomically sharp interfaces in the ultimate quantum limit for the electronic and optoelectronic processes. By assembling atomic layers of vdW materials, such as hexa boronitride, transition metal chalcogenide and graphene, we can construct atomically thin novel quantum structures. Unlike conventional semiconductor heterostructures, charge transport in of the devices is found to critically depend on the interlayer charge transport, electron-hole recombination process mediated by tunneling across the interface. We demonstrate the enhanced electronic optoelectronic performances in the vdW heterostructures, tuned by applying gate voltages, suggesting that these a few atom thick interfaces may provide a fundamental platform to realize novel physical phenomena. In this presentation, we will discuss several recent development of electronic and optoelectronic properties discovered in the van der Waals heterostructures, including hydrodynamic charge flows, cross-Andreev reflection across the quantum Hall edges states, and interlayer exciton formation and manipulations.

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