

JITCP Seminar

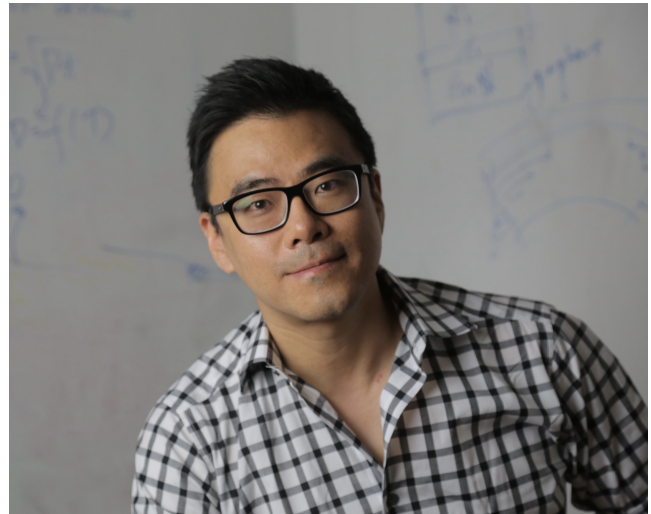
THE UNIVERSITY OF HONG KONG
HKU-UCAS JOINT INSTITUTE OF THEORETICAL AND COMPUTATIONAL PHYSICS
[Friday afternoon, 2:30 pm, Hybrid Mode]

2D material-based thin film assembly for next generation electronics

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Massachusetts Institute of Technology

There has been extremely high demand on heterogeneous integration of thin films and chips for hybridization of their functions and efficient communication between devices. Thus, vertical assembly of different materials without causing any degradation of each functional layer is the key for the success of heterogeneous integration. The first immediate challenge is to insert single-crystalline device layers in the middle of amorphous or polycrystalline layers. This comes down to the epitaxy challenge as it has been impossible to grow single-



crystalline materials on top of non-single-crystalline layers. One way to address this issue is a mechanical transfer of single-crystalline device layers and stacking of them. In a such transfer process, a substrate-free transfer is ideal for the proximity of each device layer and thin thickness of stacked chips. In this talk, I will first discuss about advanced 2D material-based layer transfer processes that can be applied for any types of device materials. I will also discuss about more aggressive way of layer stacking which is a direct growth of each component. But, again, growths of single-crystalline films on amorphous/polycrystalline is fundamentally prohibited. I will introduce innovative solutions that can do non-epitaxial growths of single-crystalline films (TMDs and other 2D materials) which will eventually unlock monolithic integration of any type of devices and materials. Finally, I will introduce how those two advanced heterointegration strategies can be combinatorially utilized to resolve the issues in 3D heterointegration.

Hybrid Mode Seminar

Friday, February 3, 2023, 2:30 pm

[In Person] CPD - 3.29 (Central Podium Levels), 3/F, The Jockey Club Tower, Centennial Campus, The University of Hong Kong

[Zoom] Meeting ID: 914 0906 4982

Password: 25600

<https://hku.zoom.us/j/91409064982?pwd=U1h2SGwwRWUrNW54dDdGcngwS1N2QT09>

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