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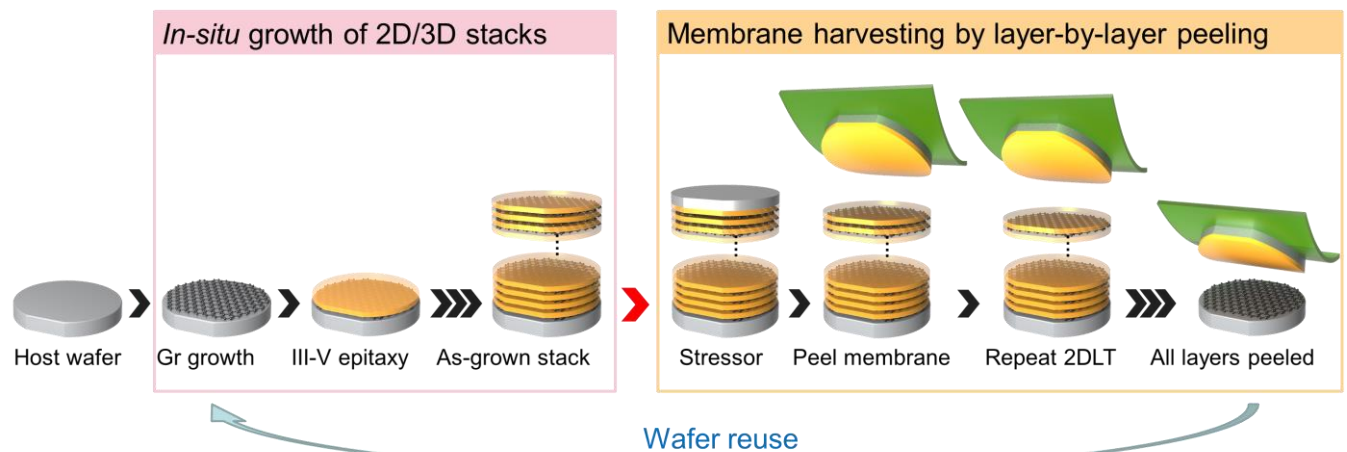
Remote Epitaxy for Multiplication of III-V Membranes by In-Situ Graphene Growth

Date: 8 December, 2023 (Friday)
Time: 10:30 am
Venue: Room 7-34 and 7-35, Haking Wong Building
The University of Hong Kong

Speaker: Mr. Ne Myo Han
Department of Mechanical Engineering
Massachusetts Institute of Technology (MIT)
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Abstract:

Single-crystal III-V compound semiconductors are important building blocks for functional devices due to their high electron mobilities, wide range of bandgaps, and excellent optoelectronic properties. However, current methods to produce their freestanding membranes for heterointegration suffer from slow processes or poor material quality. In this talk, I would like to introduce “remote epitaxy” as an approach to grow and harvest multiple wafer-scale single-crystal membranes by introducing weak van der Waals interfaces between epitaxial layers. This is achieved by directly growing graphene on III-V semiconductors in the MOCVD, which enables alternating growth of graphene and III-V semiconductor epilayers in a single run. Each epilayer in the multi-stack structure is then exfoliated to produce multiple freestanding single-crystal membranes with extremely high throughput from a single wafer. Toward the end of the talk, I will briefly introduce the applications of remote epitaxy for high-resolution LED displays, ultrathin wearable devices, and reconfigurable AI chips.



Schematic of the single-crystalline membrane production process by in situ growth of multiple stacks of epilayer/2D layer, layer-by-layer exfoliation with a stressor layer, and reuse of the substrate.



Biography:

Ne Myo Han is a Mechanical Engineering PhD Candidate at the Massachusetts Institute of Technology (MIT), where he is supervised by Prof. Jeehwan Kim and supported by the Croucher Scholarship for Doctoral Study. Prior to MIT, he received his B.Eng. (medalist) and M.Phil. in Mechanical Engineering from the Hong Kong University of Science and Technology (HKUST) under the supervision of Prof. Jang-Kyo Kim, and worked at ASM Pacific Technology as a materials engineer. At MIT, his research ranges from the growth and layer transfer of III-V and 2D materials to the fabrication and integration of novel electronic devices.

ALL INTERESTED ARE WELCOME

For further information, please contact Dr. P.C.Y. Chow at 3917 7905.