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# **Graphene and atom-thick 2D materials: Device Application Prospect**

The 2-dimensional (2D) electron systems have long been building blocks of electronic and photonic devices. Silicon MOSFET and III-V HEMT devices, for example, have been the most essential elements in micro- and nano-electronics since their early days. Various quantum well structures are important ingredients in optical components including lasers, LEDs, and photo-detectors. These traditional 2D electron systems now reconfigure themselves into atomic sheets, flourishing a whole new physics originating from the material aspects as well as the dimensionality itself. Such new physics may provide us a chance of innovating conventional electronic and photonic 2D devices. In this talk, various aspects of potential device applications of graphene and atom-thick 2D materials will be reviewed. It will cover atom-thick photo-devices, new type of transistors, and adaptation of these materials into present CMOS. The direct growth is always the key technology to make all these applications realistic, and a little prospect of wafer scale graphene and 2D material growth will also be presented.