On-chip material design with van der Waals solids

Arindam Ghosh
Department of Physics
Indian Institute of Science
Bangalore 560012

Van der Waals epitaxy is an emerging platform for material design, where atomic/molecular membranes from dissimilar layered solids can be appropriately arranged to achieve unprecedented device functionality. Ultra-high electron mobility field effect transistors, valleytronic devices, tunable Josephson junctions, high-efficiency optical detectors are typical examples of such on-chip material design. In this talk I shall demonstrate some of the new designs of electronics, optoelectronics to thermal devices, which illustrate the enormous capability of this material engineering technique. I shall demonstrate how van der Waals epitaxy can be used to alter equilibrium crystal structure of layered solids which may induce functionalities that have not been achieved before.