“Searching for transformative materials and quantum systems”

The progressive miniaturization of materials in the 21st century has enabled important discoveries and access to a wide range of phenomena of fundamental and applied interest. But future progress and innovation require a shift towards transformative material systems and integration technologies. The search for such materials beyond traditional semiconductors, such as silicon, has led to fast growing activities on atomically thin layers of van der Waals crystals, also referred to as graphene-like two-dimensional (2D) materials. The science of these systems is now a rapidly developing and vibrant field and more breakthroughs are expected as new concepts emerge from experiment and theory. Here, I will review my recent research on these new systems with a focus on the 2D indium selenide semiconductor and its polymorphs, stoichiometries and interfaces with enhanced electronic properties.

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