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Materials in the Flatland

One of the most important “property” of graphene is that it has opened a floodgate of experiments on many other 2D atomic crystals: BN, NbSe₂, TaS₂, MoS₂, etc. The resulting pool of 2D crystals is huge, and they cover a massive range of properties: from the most insulating to the most conductive, from the strongest to the softest.

If 2D materials provide a large range of different properties, sandwich structures made up of 2, 3, 4 ... different layers of such materials can offer even greater scope. Since these 2D-based heterostructures can be tailored with atomic precision and individual layers of very different character can be combined together, - the properties of these structures can be tuned to study novel physical phenomena or to fit an enormous range of possible applications, with the functionality of heterostructure stacks is “embedded” in their design.

Already now such materials bring to life a number of exciting applications. In my lecture I will review some of them.