

A Spin and Valley Modulating Device in Grapheme heterostructure: Controlling Valley and Spin Current

Authors : Adel Belayadi

Abstract : The investigation of two-dimensional (2D) heterostructures, whether in the presence or the absence of magnetic substrates that sustain several induced spin-orbit couplings, has shown a promising/essential application for advancing the emerging fields of spintronics and valleytronics. In this contribution, we study spin/valley transport in graphene-like substrates in the presence of one or several locally induced spin-orbit coupling (SOC) terms resulting from graphene-based heterostructures. The models we proposed are based on the tight-binding approach, and our findings imply an alternative approach for conducting valley-polarized currents and suggest a corresponding mechanism for valley-dependent electron optics and optoelectronic devices.

Keywords : graphene-heterostructures, tight binding pproch, Spintronics, Valleytronics

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