Spin-Orbit Effects in Graphene heterostructures

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Spin-to-charge conversion effects are at the basis of many recent developments in spintronics, from spin Hall magnetoresistance to spin-orbit torques.
In this talk I will present the opportunities that van der Waals heterostructures offer for spin-to-charge conversion.
Starting from simple devices with Pt/graphene interfaces in which the spin-to-charge conversion can be maximized when compared with conventional all-metallic structures [1], I will show more sophisticated possibilities that we have been exploring in our group in the last years [2, 3]. In particular, I will detail both the multidirectional spin Hall effect in $MoTe_2$ [4] and the creation of spin Hall effect in graphene by spin-orbit proximity effect [5 - 7].

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FIGURES

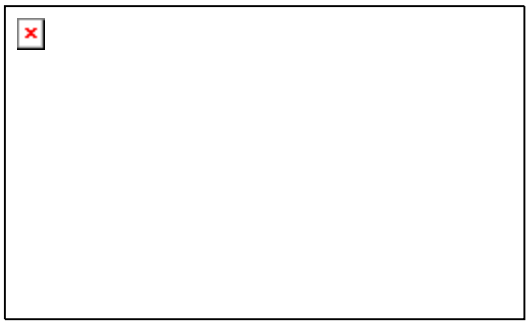

Figure 1: Immage of a spintronic device comprising a graphene spin transport channel and a $MoTe_2$ intersecting layer in which we can record multi directional spin-to-charge conversion