# GRAPHENE-BASED SPIN CURRENT WAVEGUIDES: A THEORETICAL FRAMEWORK

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The issue of magnetic interaction between dopants in carbon-based structures is of growing interest due to its potential applicability in future spintronic devices. Carbon is known as a promising material for spintronic applications but can only reach its full potential if the interaction between magnetic objects embedded into the carbon environment is fully understood. Two aspects of this magnetic interaction must be considered, depending on whether or not the magnetizations involved are in motion. The so-called dynamic and static magnetic couplings are studied separately and their differences explained. For the dynamic aspect of the magnetic coupling we show how the motion of magnetic moments might be explored so that graphene-based materials may function as low-loss spin-current waveguides. Furthermore, by further exploring the electronic properties of graphene, we can envisage this material acting also as a possible spin-transistor and as a lens for the spin current.