

# ISOTROPIC SPIN RELAXATION IN GRAPHENE ON HEXAGONAL BORON NITRIDE

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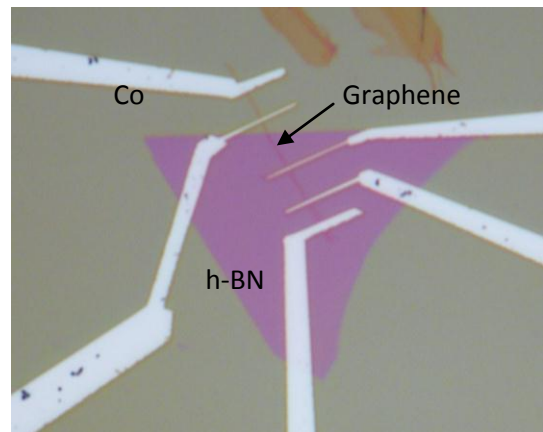
We study the spin-lifetime anisotropy of spin-polarized carriers in graphene on top of hexagonal boron nitride (h-BN) using non-local lateral spin-valve devices (Figure 1) with a method that we recently developed [1]. We first determine the in-plane spin lifetime by conventional spin precession measurements with magnetic fields perpendicular to the graphene plane. Then, to evaluate the out-of-plane spin lifetime, we create an out of plane spin population by applying an oblique magnetic field and determine the relaxation of the non-precessing spin component (Figure 2) [1]. We find, within the experimental uncertainty, that the spin relaxation in graphene on boron nitride is isotropic, as it was previously found in graphene on SiO<sub>2</sub> [1]. This result suggests that the substrate effects present on SiO<sub>2</sub>, which are expected to be absent or suppressed on h-BN, such as roughness, dangling bonds and charge traps, might play a minor role in making the spin relaxation isotropic and, more generally, in the spin relaxation [2].

## References

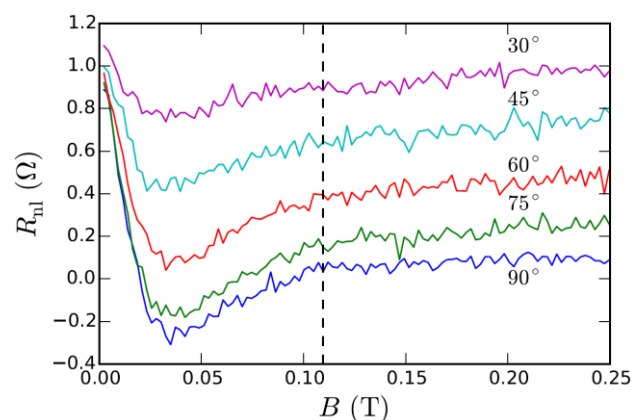
[1] B. Raes, J. E. Scheerder, M. V. Costache, F. Bonell, J. F. Sierra, J. Cuppens, J. Van de Vondel & Valenzuela, S. O. Nature Commun. 7, 11444 (2016).

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## Figures



**Figure 1:** Optical image of a typical non-local device used for the measurements. It consists of graphene on top of h-BN with Cobalt (Co) contacts.



**Figure 2:** Experimental spin precession curves for different magnetic field angles (90°, 75°, 60°, 45°, 30°) from which we extract information about the spin relaxation anisotropy