Graphene: new venues for spintronics

B. Dlubak,[1] M.-B. Martin,[1] R. Weatherup,[2] H. Yang,[1] M. Sprinkle,[3] C. Berger,[3] W. de Heer,[3] S. Hoffman,[2] J. Robertson,[2] C. Deranlot,[1] R. Mattana,[1] A. Anane,[1] F. Petroff,[1] A. Fert,[1] and P. Seneor[1]

[1] *Unité Mixte de Physique CNRS/Thales & Université Paris-Sud, France*
[2] *Department of Engineering, University of Cambridge, U.K.*
[3] *GeorgiaTech, Atlanta, USA & Institut Néel, France*

Spintronics is a paradigm focusing on spin as the information vector in fast and ultra-low-power non volatile devices such as the new STT-MRAM. Beyond its widely distributed application in data storage it aims at providing more complex architectures and a powerful beyond CMOS solution. The recent discovery of graphene has opened novel exciting opportunities in terms of functionalities and performances for spintronics devices. We will present experimental results on the impact and potential of graphene for spintronics. We will show that unprecedented highly efficient spin information transport can occur in graphene [1] leading to large spin signals and macroscopic spin diffusion lengths (∼100 microns), a key enabler for the advent of envisioned beyond-CMOS spinbased logic architectures. Furthermore, we will show that a thin graphene passivation layer can prevent the oxidation of a ferromagnet, enabling its use in novel humide/ambient low-cost processes for spintronics devices, while keeping its highly surface sensitive spin current polarizer/analyzer behavior and adding new enhanced spin filtering property [2]. These different experiments unveil promising uses of graphene for spintronics.

References:

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