COMPARATIVE STUDIES ON GIANT MAGNETORESISTANCE IN CARBON NANOTUBES AND GRAPHENE NANORIBBONS WITH FERROMAGNETIC CONTACTS

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Carbon-based structures evoke enormous interest in search for new materials for future nanoelectronics, expected to replace the conventional electronics soon. Along with carbon nanotubes, also graphene has recently given an additional impetus to this type of studies, after it was demonstrated that individual monolayers of graphite can be successfully synthesized and electrically contacted. Although it has already been realized for several years that ferromagnetically contacted carbon nanotubes reveal quite a noticeable giant magnetoresistance (GMR) effect, in the case of grephene this problem still remains to be explored. This contribution reports on comparative studies on GMR in CNTs and graphene nanoribbons of similar aspect ratios (i.e perimeter/length and width/length ratios, for the former and the latter, respectively). The problem is solved at zero temperature in the ballistic transport regime, by means of the Green function technique within the tight-binding model with the so-called wide band approximation for electrodes. It turns out that graphene, analogously to CNTs may be quite an interesting material for spintronic applications.

9.7 cm

13.4 cm

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