Abstract Submitted
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Spin-orbit coupling and electronic transport in carbon nanotubes in external fields[1] GINETOM DINIZ, S. E. ULLOA, Ohio University — We have investigated theoretically the role of spin-orbit coupling (SOC) on the conductance response of carbon nanotubes (CNT) in the presence of external electric and magnetic fields. We use an equilibrium Green's function formalism to calculate the spin resolved conductance by using a four-orbital orthogonal tight-binding representation in real space, taking into account curvature effects that induce orbital hybridization and are responsible for sizable SOC enhancements [1]. Different directions of external magnetic and electric fields (transverse and longitudinal to the CNTs), as well as length and chirality of the CNT, are shown to strongly affect the transport behavior of the systems. In particular, this results in stronger SOC effects for tubes with smaller radii. The interplay of electric and magnetic fields on the possible spin polarization of conductance will be discussed, as the sizable SOC effects result in effective control of the spin selective transport in these versatile nanoeletronic devices.
[1] J. Klinovaja et al. PRL 106, 156809 (2011).

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