Spintronic properties of a triple-quantum-dot ring

Mohammad Molavi[1], Edris Faizabadi[2,*]

[1] Faculty of Physics, Kharazmi University, Tehran, Iran

[2] School of Physics, Iran University of Science and Technology, 16846 Tehran, Iran

Abstract

In this study based on Green's function formalism, we explore some aspects of the spin-dependent properties of a triple-quantum-dot ring structure. In this structure, one of the quantum dots has been considered non-magnetic and the Rashba spin-orbit interaction (RSOI) is imposed locally on this dot, while the two others can be magnetic. Besides, the interference of electron waves in the output is led by tuning the parameters containing on-site energy of quantum dots, the magnetic flux penetrating inside the ring, the magnetic moment of dots and the Rashba spin-orbit interaction. The optimum parameters may lead to perfect splitting and polarization and simulate the Stern-Gerlach apparatus.

Keywords: Quantum Dot, Rashba spin-orbit interaction, Spin polarization, Spin splitting, Greens function

---

* Corresponding author: edris@iust.ac.ir