Carbon nanotube spin qubit

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Abstract

Semiconductors hosted qubits have a promising path to scalability relying on two well-established industries: the silicon one and the microwave one. Among them spin qubits have recently shown high fidelity gates. [1,2,3]

One major challenge is yet the extreme sensitivity of the qubits to the host material. Thanks to their unique physical properties, I will show that carbon nanotubes are seen as promising candidates for hosting a qubit with reduced decoherence channels as well as long range interactions [4-6].

References

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Figures

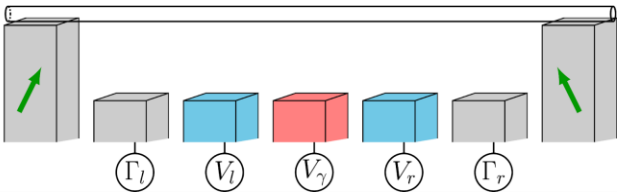

Figure 1: Schematic of the carbon nanotube lying on Source & Drain electrodes and suspended above non-collinear magnetic electrodes (gate electrodes)

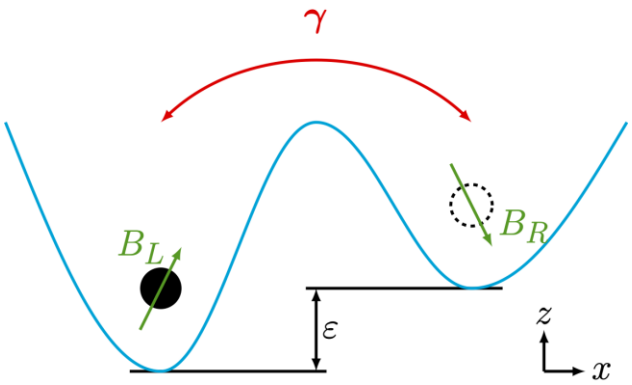

Figure 2: Schematic of the carbon nanotube spin qubit. A single electron trapped in a double potential well (blue curve). The detuning between the left and right wells is ε while the tunneling rate between the dots is γ. An inhomogeneous static magnetic field is applied.