

Entanglement detection with non-ideal ferromagnetic detectors.

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Entangled states are essential in basics quantum communication protocols and quantum cryptography. Ferromagnetic contacts which work as an electron spin detectors, give possibility of converting spin information of electrons to the electric charge, and therefore, detection of entangled states with electric current measurements. Using the entanglement witness (EW) technique [1] we find the minimal spin polarization of ferromagnetic detectors that allows for detecting entanglement. Required spin polarization for entanglement detection by the EW is lower than that for the Bell CHSH inequalities test [2], providing the EW approach more efficient in the entanglement detection.

References:

- [1] M. Horodecki et al., Physics Letters A 223, 1 (1996)
- [2] W. Kłobus, et al., Phys. Rev. B 89, 125404 (2014).