

Spin detection of ballistic electrons injected by a scanning-tunneling-microscope

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We have studied electronic and optical properties of nanoscale regions by a technique of scanning-tunneling-microscope (STM)-induced light emission [1,2,3], in which electrons are injected by the STM tip with spatial resolution of the STM and the light emitted as a result of inelastic scattering of the electron is detected at a far-field distance. In this paper, we used the technique to detect circularly-polarized light and studied the spin transport phenomena of electrons injected from a STM tip. Based on experimental data of spin injection efficiency and spin polarization, we discuss the mechanism of spin transport and spin scattering in ferromagnetic metal-semiconductor system.

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