NS-003

# Electrical spin injection and detection in semimetallic films

이경일

한국과학기술연구원 스핀트로닉스연구단

The spin injection technique is extended to semimetal bismuth samples in a lateral spin valve geometry. We study spin injection, diffusion, and detection in a material system where a small change in sample stoichiometry results in a large change in the electronic and spin dependent transport properties of the nonmagnetic material. Measurements of magnetoresistance, using a magnetic field applied in the sample plane, as well as the Hanle effect, using a field applied perpendicular to the sample plane, are reported. We demonstrate two remarkable results: i) a spin diffusion length of 230 $\mu$m ($T$=2 K) in a BiPb sample with temperature dependent resistivity, $\rho(T)$, which decreases with decreasing $T$ is the longest known value in a thin film; ii) the interfacial spin polarization is 10% in BiPb samples with decreasing $\rho(T)$ and an order of magnitude smaller 0.8% in Bi samples where $\rho(T)$ increases with decreasing $T$.