

Electrical detection of spin polarization in non-local geometry

TARAS SLOBODSKYY, RAJKIRAN THOLAPI, LENNART LIEFEITH AND WOLFGANG HANSEN

*Institute of Nanostructure and Solid State Physics, University of Hamburg,
Jungiusstrasse 11, D-20355 Hamburg, Germany
Taras.Slobodskyy@physik.uni-hamburg.de*

ABSTRACT

Improvement of all-electrical spin injection and detection efficiencies at the ferromagnet/semiconductor interface is an important research topic in spintronics. Advance in control over interface properties during sample preparation and improvement in the spin detection scheme lead to observation of spin injection signals in GaAs [1] and InAs [2] material systems. Specifically, InAs 2DEG systems attracted large attention due to possible utilization of the large spin orbit interaction and a recent observation of spin injection in ballistic regime [3].

In our contribution we will discuss our recent progress in experimental and theoretical investigations of Fe/GaAs interfaces. We will address the strain evolution in the Fe layer during low-temperature post-growth annealing of the interface [4]. Detailed analysis of strains and interface compounds [5] will shed light on possible connection between interface states and the morphology of the interface. We will further discuss our recent results on successful spin injection through Fe/GaAs [6] and Fe/InAs [7] interfaces. Finally, we will discuss effect of spin detection and spin injection electrodes geometries on detected signal in the lateral four-terminal non-local geometry [8].

References

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