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# Figures of Merit of Semiconductor Integrated Magnetic Sensors

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Experimental results are presented concerning semiconductor magnetic sensors directly compatible with microelectronics technologies. Noise and sensitivity characteristics have been measured and are compared for different devices realized with Si, GaAs and III–V technologies; relevant parameters (e.g., biases, device geometries, technologies, materials) are discussed. Very good resolutions ($0.150\,\mu T/\sqrt{Hz}$) have been obtained from both Si and GaAs devices.

## 1. Introduction

Various semiconductor magnetic sensors have been developed in the last decade based on carrier deflection by the Lorentz force. Most of them can be realized with microelectronics-compatible technologies in the "smart sensor" perspective.

The main families of integrated magnetic sensors (with voltage or current output signal) are reviewed after a brief recall of their physical principles of operation, showing the important parameters (e.g., carrier mobility and concentration, dimensions).

A recent trend is to investigate the new possibilities of GaAs technology and III–V compounds (including heterostructures or pseudomorphic strained layers), in order to take advantage of higher electron mobility (and possible lower noise level).

The aim of this paper is to present our experimental results on different structures realized with Si or III–V technologies in order to compare sensors and their