

Designing of a rotation sensor using micromagnetic simulations

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In this paper we show the good sensitivity of the Planar Hall Effect (PHE) signal which can be, together with MR measurements, a useful technique not only for the characterization of thin films but, also for building low cost rotation sensors for microcompass or contactless potentiometer applications. Measurements for field and angular dependencies of the PHE were made on Permalloy based thin films and multilayered structures. At low magnetic fields, i.e., less than 200 Oe, we observed distortions from the expected sinusoidal shape of the PHE angular dependence. In order to have a better understanding of this behaviour, micromagnetic simulations were performed for square, circular and ring-shape thin film structures used as rotation sensors. Finally, a method to improve the quality of the output signal regarding the angular dependence of the PHE voltage is presented. The resolution of the rotation sensor is better than 0.5 degrees.

← 13.4 cm →

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9.7 cm