Magnetic anisotropy detection in a cobalt foil determined by means of a magnetoimpedance sensor

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Due to their soft magnetic properties and negative near-zero magnetostriction and high transversal permeability, Co-rich microwires are one of the most popular sensing elements used in magnetic sensors. In this work, the instrumentation of a magnetoimpedance sensor is presented, based on an amorphous Co-rich microwire as the sensing element, and by means of a microstrip transmission line. A 1mW (0 dBm) signal in the frequency range from 1 to 10 MHz was used to energize the sensor, where the magnetic field of the cobalt foil was detected by the magnetoimpedance sensor. The foil was rotated during the test, finding that the curve shift depends on the angle of rotation of the foil, but it is independent of the excitation frequency. The interaction between the sensor and the cobalt foil modified the magnetoimpedance response, which is related to the cobalt foil magnetization. Left-wise and right-wise shifts were observed in the curves; this behavior was correlated with the magnetic anisotropy of the foil. Additionally, the magnetoimpedance behavior of microwire and the foil were analyzed and correlated with spin rotation dynamics.

References:

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