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Permalloy Nanostructures for magneto-impedance measurements

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The magnetic impedance (MI) effect attracts an increasing interest due to its high value in comparison to magnetic resistance (MR) effects, opening applications as high-sensitivity magnetic field detectors or for magnetic recording heads. However, it is difficult to obtain the magnetic domain configuration of conventional samples used in MI experiments, i.e., amorphous wires, magnetic multilayers and ribbons. In order to find the relation between the magnetic domain structure and the respective value of the MI effect, permalloy ($\text{Ni}_{81}\text{Fe}_{19}$) nanowires and thin films were produced by electron-beam lithography (EBL), lift-off technique and focused ion beam (FIB) milling. Wires and other structures (rectangles, circles), and domain pinning sites (notches) were manufactured with optimized dimension (size, thickness, etc.). The magnetic structure of our samples and the MI effects were analyzed by magnetic force microscopy and transport measurements.