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Soft ferromagnetic microribbons with enhanced GMI effect for advanced magnetic sensor applications[1] A. RUIZ, A. CHATURVEDI, P. MUKHERJEE, H. SRIKANTH, M.H. PHAN, Department of Physics, University of South Florida — Soft ferromagnetic ribbons with giant magneto-impedance (GMI) effect are attractive candidate materials for high-performance magnetic sensor applications. GMI is a large change in the ac impedance of a ferromagnetic conductor subject to a dc magnetic field. There is a need for further improving GMI response of existing materials, as well as reducing the size of a GMI-based sensor for use in micro-sensing systems. In this work, we report the enhancement of GMI in soft ferromagnetic ribbons (Metglas® 2714A) at high frequencies by reducing the width of the ribbon to the micrometer scale. This finding is of practical importance, as sensors with enhanced field sensitivity and reduced size find wider ranging applications. The origin of the enhanced GMI effect in the microribbon is explained in terms of the skin and demagnetization effects. The relative contributions to the magneto-impedance from the magneto-resistance and magneto-reactance have been analyzed and discussed in detail.

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