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Hysteresis Design of Magnetic Materials for Efficient Energy Conversion

Tuesday, 04 November 2025, 9:00 s.t., @TUDa and via Zoom

Prof. Diana Leitao
Eindhoven University of Technology

Zoom Meeting
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Towards reprogrammable spintronic sensors

Abstract:

Spintronic sensors can deliver high sensitivity and spatial resolution in magnetic field detection, ideal to leverage challenging applications in navigation, robotics or biomedicine. In my group we focus on giant and tunnel magnetoresistance (xMR) sensors that exploit changes in the electrical resistance of ferromagnetic thin films in response to an external magnetic field.[1] In this talk, current approaches to engineer key properties, e.g. multiaxial detection[2], limits of detection[3], tunable sensitivity, of these magnetic sensors will be discussed. We will start from the design and engineering of the thin-film multilayers, then evolving for the device geometry and bridging into the photonics domain addressing the level of development of the chosen approaches. Such strategies open pathways to design versatile sensing devices with on-demand tunable characteristics.

1. Leitao *et al. npj Spintronics*, *2*(1) (2024)
2. van Riel *et al.* Comm. Mat. 6 (2025) 110; van Riel *et al.* Laser-reprogrammable vector-sensitive magnetic sensor, JEMS 2025
3. dos Santos *et al.* Optimization of NiFeSi towards ultrasoft free layers in spintronic sensors, JEMS 2025

About the speaker:

Diana Leitao is a professor in the Applied Physics Department at Eindhoven University of Technology. Her research focus is on exploring novel thin-film stackings, designs, and integration to improve the performance of magnetoresistive sensing devices and provide added functionalities. Leitao actively contributes to the international magnetism community via IEEE Magnetics Society and European Magnetism Association (EMA) where she is currently the officer for Industrial Relations.