

NANO-ENGINEERING OF DOMAIN-WALL DEVICES USING FOCUSED ELECTRONS/IONS

H.J.M. Swagten^a, J.H. Franken^a, M. Hoeijmakers^a, J.T. Kohlhepp^a,
B. Koopmans^a, E. van Veldhoven^b, D. Maas^b, P. Trompenaars^c,
J.J.L. Mulders^c

^aEindhoven University of Technology, Eindhoven, The Netherlands

^bTNO Science and Industry, Delft, The Netherlands

^cFEI Electron Optics, Eindhoven, The Netherlands

In novel domain-wall (DW) devices with perpendicular magnetic anisotropy (PMA) a number of exciting phenomena have been observed very recently, *e.g.* in strips containing ultrathin Co layers. In these devices, the use of ion or electron beams to modify the magnetic properties or to integrate additional magnetic elements, may add unique opportunities to control and tune the physics of DWs for future spin-torque-based memory devices. For some of our recent contributions, see, *e.g.*, R. Lavrijsen *et al.*, Appl. Phys. Lett. **96**, 222502 (2010), and J.H. Franken *et al.*, Appl. Phys. Lett. **98**, 102512 (2011).

In this presentation, three applications will be discussed where focused ion/electron beams are used for precise control over DWs, *viz.* (1) the anisotropy-induced tunable creation and pinning/depinning of DWs, (2) the introduction of a new oscillator concept for future GHz applications, based on anisotropy-controlled DWs, and (3) alternative control and pinning of DWs by Electron Beam Induced Deposition (EBID) of arrays of Fe-containing magnetic nanopillars.

13.4 cm

Subject category :

4. Spin Electronics and Magneto-Transport

Presentation mode :

Oral

Corresponding author :

Henk Swagten

Address for correspondence :

Eindhoven University of Technology

Department of Applied Physics

P.O. box 513

5600 MB Eindhoven

The Netherlands

Email address :

h.j.m.swagten@tue.nl

9.7 cm