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**Field-driven domain wall propagation in magnetic nanowires**[1]

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In this talk, I will present a global picture of magnetic-field induced domain wall (DW) propagation along a magnetic nanowire [1,2]: A static DW cannot exist in a homogeneous magnetic nanowire when an external magnetic field is applied. Thus, a DW must vary with time under a static magnetic field. A moving DW must dissipate energy due to the Gilbert damping. As a result, the wire has to release its Zeeman energy through the DW propagation along the field direction. The DW propagation speed is proportional to the energy dissipation rate that is determined by the DW structure. An oscillatory DW motion, either the precession around the wire axis or the breath of DW width, should lead to the speed oscillation. Based on this view, a relationship between the domain wall propagation velocity and the domain wall profile, regardless of the DW types, is found. A new velocity-field formula beyond the Walker breakdown field is derived. The formula is in excellent agreement with both experiments and numerical simulations.

[1] "Magnetic field driven domain wall propagation in magnetic nanowires," X.R. Wang, P. Yan, J. Lu, and C. He, Annals of Physics 324, 1815 (2009).
[2]"High field domain wall propagation velocity in magnetic nanowires," X.R. Wang, P. Yan and J. Lu, Europhysiccs Letters 86, 67001 (2009).

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