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Mechanisms for low-field, and multiple domain wall injection into magnetic nanowires.[1] SARAH REIFF, ANDREW KUNZ, Marquette University — The motion of a domain wall within a magnetic nanowire is important for the development of future recording, sensing and logic devices. The speed of a field driven domain wall is quickest when the applied magnetic field is below the so-called Walker Field which depends on the size and material properties of the wire. However, the field needed to inject a domain wall into a wire is much greater than the Walker Field which leads to slow wall motion because of the nucleation of vortices and anti-vortices, or fast motion with complicated domain wall structures. We present Landau-Lifshitz simulation results showing a significant decrease in the field needed to inject a domain wall into the wire for a variety of injection designs including: pads, rings, straight ends, and tapered ends. We also find that by applying a transverse field the required driving field to inject the wall decreases, and that the domain wall motion in the wire is faster. The magnetization of the pad and ring injection designs can be easily manipulated so that multiple walls with a known magnetization structure are injected allowing for faster, more reliable domain wall motion.

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Andrew Kunz
Marquette University

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