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Comparison of Current and Field Driven Domain Wall Motion in Beaded Permalloy Nanowires[1] ENNO LAGE, SUMIT DUTTA, CAROLINE A. ROSS, Massachusetts Institute of Technology — Domain wall based devices are promising candidates for non-volatile memory devices with no static power consumption. A common approach is the use of (field assisted) current driven domain wall motion in magnetic nanowires. In such systems local variations in linewidth act as obstacles for propagating domain walls. In this study we compare simulated field driven and current driven domain wall motion in permalloy nanowires with anti-notches. The simulations were obtained using the Object Oriented MicroMagnetics Framework (OOMMF). The wires with a constant thickness of 8 nm exhibit linewidths ranging from 40 nm to 300 nm. Circular shaped anti-notches extend the linewidth locally by 10% to 30% and raise information about the domain wall propagation in such beaded nanowires. The results are interpreted in terms of the observed propagation behavior and summarized in maps indicating ranges of different ability to overcome the pinning caused by anti-notches of different sizes. Furthermore, regimes of favored domain wall type (transverse walls or vortex walls) and complex propagation effects like walker breakdown behavior or dynamic change between domain wall structures are identified

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