

Abstract Submitted  
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**Enhanced controllability of domain-wall pinning by asymmetric control of domain-wall injection**<sup>1</sup> SUNG-MIN AHN, Massachusetts Institute of Technology — Recently, using magnetostatic interactions via the magnetic-charge distributions, a few ideas to effectively and selectively manipulate the DW pinning without additional alterations to the nanowire have been suggested. Even though the DW pinning via the magnetostatic interaction is locally controlled, the pinning strength is insufficient to reliably manipulate the DW propagation in the real DW-mediated device. Here, it is experimentally studied that depinning fields of domain walls (DWs) under an interaction between magnetic charges distributed at a nanobar and at a notch can be enhanced by controlling injection fields for injecting DWs into the ferromagnetic nanowire with an asymmetrical nucleation pad. The DWs injected from the asymmetrical pad show an asymmetrical dependence of the injection field on the saturation angle and are pinned by the notch with the nanobar vertical to it. We have found that the shape of the pinning potential energy experienced by the DW depends on the magnetized direction of the nanobar and the level of that is lifted by the injection field leading to an increase in the depinning field with respect to the saturation angle. This is consistent with our estimation based on micromagnetic simulation.

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