

Abstract Submitted  
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**Crossed Ratchet Effects for Magnetic Domain Wall Motion<sup>1</sup>** JOSE I. MARTIN, A. PEREZ- JUNQUERA, Dpto. Fisica, U. Oviedo, Spain, V.I. MARCONI, A.B. KOLTON, Dpto. Fisica Atomica Molecular y Nuclear and GISC, U. Complutense, Madrid, Spain, L.M. ALVAREZ- PRADO, Dpto. Fisica, U. Oviedo, Spain, Y. SOUCHE, Inst. Neel, CNRS and U. Joseph Fourier, Grenoble, France, A. ALIJA, M. VELEZ, Dpto. Fisica, U. Oviedo, Spain, J.V. ANGUIA, IMMM, CNM, CSIC, Tres Cantos, Spain, J.M. ALAMEDA, Dpto. Fisica, U. Oviedo, Spain, J.M.R. PARRONDO, Dpto. Fisica Atomica Molecular y Nuclear and GISC, U. Complutense, Madrid, Spain — The driven motion of domain walls in extended amorphous magnetic films patterned with a periodic array of asymmetric holes has been studied experimentally and theoretically. We find two crossed ratchet effects of opposite sign that change the preferred sense for domain wall propagation, depending on whether a flat or a kinked wall is moving. These crossed effects have an interesting consequence with potential applications: the system keeps memory of the sign of the last saturating state even in a zero magnetization configuration. By solving numerically a simple  $\phi^4$ -model we show that the essential physical ingredients for this effect, the competition between drive, elasticity and asymmetric pinning, are quite generic and could be realized in other experimental systems involving elastic interfaces moving in multidimensional ratchet potentials.

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