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Motion of a vortex domain wall in a rough nanowire[1] PAULA MELLADO, Johns Hopkins University, DAVID CLARKE, University of California, Riverside, OLEG TCHERNYSHYOV, Johns Hopkins University — The motion of a vortex domain wall in a ferromagnetic nanowire under the influence of an applied magnetic field has been recently cast in the language of collective coordinates [1]. The theory, taking into account the two softest modes of the domain wall, works well below and immediately above Walker's breakdown [2] and can be extended to include the influence of spin current. Here we examine the motion of a vortex domain wall in a wire with rough edges. Integrating out the transverse coordinate yields an effective one-dimensional problem of a massive particle moving in a viscous medium. The edge roughness translates into a combination of a random pinning potential and a random Zeeman force. We calculate the average velocity of the domain wall and the probability of passing a wire of specified length as a function of the applied magnetic field. [1] O. A. Tretiakov *et al.,* Phys. Rev. Lett. **100,** 127204 (2008). [2] D. J. Clarke et al., Phys. Rev. B **78,** 134412 (2008). The work was supported in part by the NSF Grant DMR-05204291.

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