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Transport across a pinned domain wall across a GaMnAs constriction: from AMR to spin-dependent tunneling. SUNG UN CHO, HYUNG KOOK CHOI, FABIO C.S. DASILVA, TERESA OSMINER, DAVID P. PAPPAS, YUN DANIEL PARK, DEPARTMENT OF PHYSICS AND ASTRONOMY, SEOUL NATIONAL UNIVERSITY, SEOUL 151-747, KOREA TEAM, NATINAL INSTITUTE OF STANDARDS AND TECHNOLOGY, BOULDER CO 80305, USA TEAM — We report on the different magnetotransport mechanism across a pinned domain wall in a GaMnAs nanowire dependent on constriction size. Nanometer-sized constrictions are realized in LT-MBE epifilm GaMnAs by standard e-beam lithography and wet-etch chemistries, as well as a "break-junction method" to further decrease constriction size. Four-point probe DC IV measurements- with applied fields at varying angles to wire axis- are utilized to study the transport mechanism- as well as magnetic properties. As constriction size approaches epifilm thickness, nonlinear IV response is observed with a differing field dependence on temperature. As constrictions become smaller, we observe a tunneling AMR-like behavior. This effect is more evident after series of high current pulses are applied to decrease the constriction width. "Break-junction" method results in higher constriction resistances and increases in resulting MR values.

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