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High resistance demagnetized state in $La_{0.67}Sr_{0.33}MnO_3/SrTiO_3/La_{0.67}Sr_{0.33}MnO_3$ magnetic tunnel junctions. ERIC WERTZ, QI LI, The Pennsylvania State University — Magnetic tunnel junctions were fabricated from $La_{0.67}Sr_{0.33}MnO_3/SrTiO_3/La_{0.67}Sr_{0.33}MnO_3$ (LSMO) heterostructures on STO substrates. The junctions showed a tunneling magnetoresistance (TMR) $\approx$ 360% at 5K when initially subject to a high magnetic field. However, when demagnetized, the junctions displayed a much higher resistance than that found in the standard TMR scan. Within a low magnetic field range, after demagnetization, the junctions showed a TMR $\approx$ 450% and much sharper switching. Differences between resistance states achievable at $<$ 500 Gauss yield a TMR $\approx$ 800%. The high resistance state may indicate the LSMO layers preferentially choose a more efficient opposite magnetic domain alignment after demagnetization. Initial demagnetization, rather than high field coercion, may be technologically applicable in magnetic tunnel junction preparation. $La_{0.67}Ca_{0.33}MnO_3$/STO/LSMO junctions were also fabricated and showed anomalous TMR effects dependant on the relative angle of the applied magnetic field.

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