

Abstract Submitted
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IrMn pinning rings to suppress closure domains in the sense layer of magnetic tunnel junctions WILLIAM EGELHOFF, CINDI DENNIS, JOHN UNGURIS, CASEY UHLIG, ROBERT MCMICHAEL, MARK STILES, CEDRIC POWELL, NIST — We have investigated very soft magnetic materials as sense films for use in magnetic tunnel junctions. One problem MTJs face is that the soft layer tends to break up into domains. Flux closure at the edges seems to be the driving force. Such domains are incompatible with low noise MTJs. We have found what appears to be a solution to this problem using an IrMn ring at the edges of the sense layer. Using a soft-film circle ~ 100 microns in diameter and an IrMn ring ~ 10 microns in width at the edge of the circle, we have a central circle ~ 80 microns in diameter that is nearly as soft as a large area film. The pinning of the soft layer appears to die off within a few microns of the IrMn edge, leaving ample area for an MTJ structure on a single-domain soft layer. In addition, the hard axis of the soft film (which is used to attain a sensor with linear response) has very little hysteresis.

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