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Giant Magnetoresistance in GaMnAs/Py Bilayers JUSTIN GUENTHER, ROBERT TOLLEY, HUSSEIN ABUJEIB, TAYLOR REID, Miami University, A. SOKOLOV, University of Nebraska-Lincoln, X. LIU, J.K. FURDYNA, University of Notre Dame, K.F. EID, Miami University — Giant magnetoresistance (GMR) requires a trilayer, typically consisting of a diamagnetic layer sandwiched between two ferromagnetic layers. The middle layer eliminates coupling between the ferromagnetic ones. Using a ferromagnet bilayer might be an advantageous alternative, so it is important to study GMR effect in such bilayers. We fabricated and measured the magnetoresistance of GaMnAs/Py bilayer micro-structures, two ferromagnets which do not couple magnetically. Our device geometry (the circular transfer line method) eliminates the bulk contribution to resistance, which allows us to study the interface magnetoresistance. Contrary to reports in literature (S. Mark et al., PRL 103, 017204, 2009), our results show a measurable coupling between Py and GaMnAs. This is manifested when we replace the Py layer with a superconducting Nb layer. Furthermore, we conclude that the observed magnetoresistance effect is due to anisotropic magnetoresistance in bulk GaMnAs rather than the interface.

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