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Observation of Antiferromagnetic Interlayer Exchange Coupling in a GaMnAs/GaAs:Be/GaMnAs Tri-layer JONATHAN LEINER, XINYU LIU, JACEK FURDYNA, MARGARET DOBROWOLSKA, University of Notre Dame, HAKJOON LEE, TAEHEE YOO, SANGHOON LEE, Korea University — A series of GaMnAs/GaAs:Be/GaMnAs trilayers were fabricated by low-temperature molecular beam epitaxy in the hope of establishing conditions under which antiferromagnetic (AFM) interlayer exchange coupling (IEC) between the GaMnAs layers can occur in such structures. Magnetotransport measurements revealed that such AFM IEC has been achieved in the sample with the thinnest GaAs spacer (5 nm) and highest Be doping in the series. The AFM coupling is revealed by a distinct increase in resistance occurring before the applied field is reduced to zero. SQUID measurements on this sample show a lowered magnetization at temperatures below 35K, which is another characteristic of AFM coupling in that temperature range. Hysteresis loops also show two distinct steps when measured below 40 K. AFM was not observed in other samples in the series, thus providing a valuable limit for the spacer thickness and Be doping in which AFM IEC can be expected.

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