

Abstract Submitted
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Investigations of the magnetocrystalline anisotropy by the Planar Hall Effect in (Ga,Mn)As epilayers grown on vicinal GaAs substrates¹ W. L. LIM, X. LIU, K. DZIATKOWSKI², Z. GE, S. SHEN, J. K. FURDYNA, M. DOBROWOLSKA, Department of Physics, University of Notre Dame, IN 46556 USA — An asymmetric shift of the Planar Hall resistance is observed in the ferromagnetic (Ga,Mn)As epilayers grown on vicinal GaAs substrates, due to the superposition of both the in-plane Planar Hall Effect (PHE) and the out-of-plane Anomalous Hall Effect (AHE). The asymmetric shift reveals the direct manifestation of the strong magnetocrystalline anisotropy that confined the magnetization to the crystalline plane, providing a non-zero normal component of the magnetization with respect to the sample plane at low fields. This shift allows one to measure both components of AHE and PHE simultaneously in these (Ga,Mn)As thin films. We found that the ratio of the AHE resistance to the average PHE resistance change is independent of the vicinal angles. The asymmetry shift is found to be reduced with the increase of the temperature. At the temperature around 30K, the anisotropic magnetoresistance obtained by the PHE measurements shows a significant different profile near the switching fields during the magnetization reversal processes, indicating a complex competition between the cubic magnetocrystalline anisotropy and the uniaxial anisotropy in these samples grown on vicinal GaAs substrates.

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