The contribution of the exchange biased field direction in multilayer thin films to planar Hall resistance

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Abstract: Recently, planar Hall effect (PHE) has been widely pursued due to its application potential for biosensors. Planar Hall sensor is based on the anisotropy magnetoresistance and exhibits many advantages, such as large signal-to-noise ratio at low frequencies and high sensitivity at low applied field. The planar Hall resistance (PHR) curve in multilayer thin films with spinvalve structure has pre-eminent sensitivity when compared to single layer and bilayer thin films. In this work, we report a model for PHR calculation that includes the behaviour of single domain basic structure in the external magnetic field. Our results show a qualitative dependence between PHR curves and the angle (?) between the exchange biased field direction and the easy axis of the free layer. As the ? increases the sensitivity of the PHR curves also increases. Further, it is shown that our calculation helps to determine the exchange biased field direction. ?? 2007 WILEY-VCH Verlag GmbH & Co. KGaA.

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