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Sponsoring Unit: DCOMP

Chair: Steven Erwin, Naval Research Laboratory

Abstract ID: BAPS.2011.MAR.Y10.8

Abstract: Y10.00008 : Measuring Transport Properties of Thin Films Under Isotropic and Anisotropic Strain Using Piezoelectric Substrates

9:24 AM–9:36 AM

[Preview Abstract](#)

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Thin film systems have been of great technological interest in the last few decades due to their unique properties. It is crucially important to understand transport properties of such films under strain for some applications such as in strain gauges. Piezoelectric materials have been used in the past to study the isotropic strain-dependent properties of magnetotransport devices. We have extended this technique using one of the shearing modes of a Lead Magnesium Niobate-Lead Titanate (PMN-PT) crystal poled in the $\langle 111 \rangle$ direction to study anisotropic strain in thin films. A double Hall Bar pattern oriented along the eigenaxes of the piezoelectric shearing mode permits the characterization of the film in both directions simultaneously. A uniform field in the piezoelectric substrate may be achieved for patterned devices by growing a metal surface surrounding the entire pattern. We will discuss how the changes in the carrier density and electron mobility

associated with strain can be characterized in thin metal films deposited directly on the PMN-PT substrate.

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