Abstract Submitted for the MAR06 Meeting of The American Physical Society

Giant Magneto-Refractive Effect in Pseudo-Valve Thin Films JARED D. ROKITOWSKI, NAM H. KIM, JIAN-QING WANG, Binghamton University — Magnetic-field-induced changes in infrared transmission of Co/Cu/Co pseudo spin-valve (PSV's) thin films are studied for the Magnetorefractive Effect (MRE). Samples are deposited on a Si (100) wafer under a high vacuum using magnetron sputtering, followed by annealing at various temperatures up to 6000C to enhance the GMR effect. A Thermo Electron Nexus 670 FT-IR spectrometer is used to measure a mid-IR spectrum with wavelengths ranging from $2.5\mu m$ to $30\mu m$. The transmitted spectra through the thin films, placed in a magnetic field, were measured by a KBr detector at room temperature. The measured GMR value for a sample made up of several layers, Fe(5nm)/Co(5nm)/Cu(3nm)/Co(2nm), that has been annealed at 2500 c is about 2% at room temperature. This sample exhibits a sharp low switching field at about 20G and a gradual high field switching at half peak height, approximately 400G. Variations of about 1.0% in the intensity of the transmitted IR spectrum are observed for a range of magnetic field strengths up to ± 1300 G with special attention focused in the low field response (roughly -100 to 100 Gauss). The MRE is analyzed for a particular wavelength of 4m. The results of this graph produce a typical GMR curve. Earlier studies of Spin-vales have yielded comparable MRE results. Detailed experimental results (1) and possible explanations will be discussed. 1. S. Uran et al., Phys. Rev. B 57, 2705 (1998).

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Date submitted: 07 Dec 2005

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