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Coupled Precession Modes in Indirect Exchanged-Coupled Thin Films STEVEN MICHALSKI, JIAN ZHOU, BOB BUCKLEY, RALPH SKOMSKI, ROGER KIRBY, Department of Physics and Astronomy and Nebraska Center For Materials and Nanoscience, Unversity of Nebraska, Lincoln NE, 68588-0111 — Static and dynamic magnetic properties of exchange-coupled magnetic layers have been investigated by magneto-optical measurements. Our samples are [Pt/Co] multilayers with perpendicular magnetic anisotropy (PMA) exchange-coupled to a Co (Ni) layer with in-plane magnetic anisotropy by a variable thickness intervening Pt layer. The magnetic properties of such systems are controllable by tuning the exchange strength and PMA. To measure the magnetization precession, we use a femtosecond laser in a pump-probe experiment with direct optical excitation and preliminary measurements using a magnetic field pulse excitation. Both the strength and the angle of an external applied magnetic field were varied and for many samples, two modes with two distinct precession frequencies were observed, with frequencies that depend on the strength and the angle of the applied field. Our results are interpreted by a LLG-based model which predicts two modes whose behaviors depend on the strength and sign of the exchange coupling. This model is in a good qualitative agreement with our data and allows us to estimate the magnitude of the exchange coupling between the two layers. This work is supported by NSF-MRSEC, NCMN, and the W. M. Keck Foundation.

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