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Abstract

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Magneto-optical Phase Transition in a Nanostructured Co/Pd Thin Film¹ CHIDUBEM NWOKOYE, LAWRENCE BENNETT, EDWARD DELLA TORRE, ABID SIDDIQUE, MING ZHANG, MICHAEL WAGNER, Institute for Magnetic Research, Department of Electrical and Computer Engineering, The George Washington University, Washington, DC 20052, USA, FRANK NARDUCCI, Naval Air Systems Command, Avionics, Sensors and E*Warfare Department, Patuxent River, MD 20670, USA — Interest in the study of magnetism in nanostructures at low temperatures is growing. We report work that extends the magnetics experiments in [1] that studied Bose-Einstein Condensation (BEC) of magnons in confined nanostructures. We report experimental investigation of the magneto-optical properties, influenced by photon-magnon interactions, of a Co/Pd thin film below and above the magnon BEC temperature. Comparison of results from SQUID and MOKE experiments revealed a phase transition temperature in both magnetic and magneto-optical properties of the material that is attributed to the magnon BEC. Recent research in magnonics has provided a realization scheme for developing magnon BEC qubit gates for a quantum computing processor [2]. Future research work will explore this technology and find ways to apply quantum computing to address some computational challenges in communication systems. [1] Bennett L. H. and Della Torre, E. (2014) *J. Mod. Phys.* 5, 693. [2] Andrianov S. N. and Moiseev, S. A. (2014) *Phys. Rev. A* 90,042303.

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