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Phase Detection of Propagating Magnetostatic Spin Waves: From Damon-Eschbach to Backward Volume Modes[1] JONATHAN TROSSMAN, JINHO LIM, WONBAE BANG, Department of Physics and Astronomy, Northwestern University, JOHN KETTERSON, Department of Physics and Astronomy, Department of Electrical and Computer Engineering, Northwestern University, C. C. TSAI, Department of Engineering and Management of Advanced Technology, Chang Jung Christian University — We report experiments which characterize spin wave propagation in a thin (3.05 micron) (111) YIG film for arbitrary angles between the in-plane magnetic field and the mode wavevectors. By measuring the magnetic field evolution of the phase of the wave traveling across the film we deduce the frequency dependence of the wavevector, the dispersion relation, from which the mode velocity follows. Additionally, we observe multiple nodes in the regime of the propagating Damon-Eschbach mode; these arise from avoided crossings associated quantization of the higher backward volume modes along the film normal together with the exchange energy. This, in turn, allows a determination of the exchange energy.

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