NCMN

NEBRASKA CENTER FOR MATERIALS AND NANOSCIENCE
2014 SEMINAR SERIES PRESENTS

NCMN

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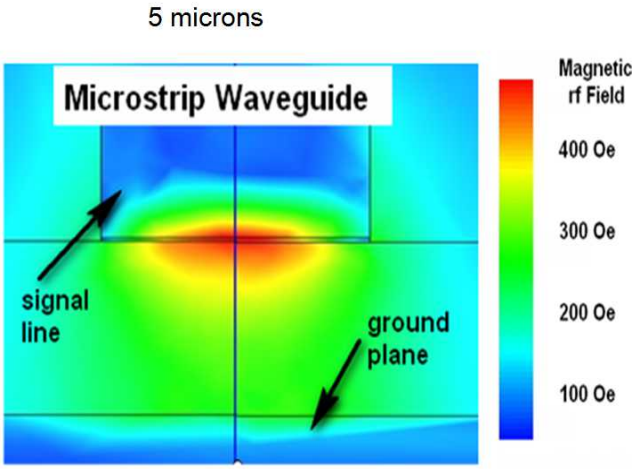
Nonlinear effects in magnetic systems



Ultrasmall waveguide geometries can produce huge oscillating microwave fields up to about 500 Oe. This is in contrast to typical cavity-based ferromagnetic resonance measurements where the oscillating magnetic field has an amplitude of about 0.1 Oe, Using these large fields, we explore nonlinear ferromagnetic dynamics in Permalloy and Fe. We demonstrate how two input waves at different frequencies can interact to produce a minimum of 7 output waves, and how pumping energy at one frequency can amplify a wave at a different frequency. We also demonstrate the development of a comb of equally spaced frequencies. The experimental results are explained using both simple perturbation theory and micromagnetics calculations, but the emphasis here is on understanding the effect, and long complicated calculations are completely avoided. Finally we discuss some recent nonlinear results, where the decay time of transients can be increased by a factor of 1000 or more.

Wednesday, September 3, 4:00 pm
Room 136 Jorgensen Hall

3:45 pm—Refreshments served in Jorgensen Atrium area

Host:
Prof. Christian Binek
Department of
Physics & Astronomy

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