Abstract Submitted
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The physics of magnetic resonance in the proximity of energy instability[1] MICHAEL PECHAN, CHENGTAO YU, RYAN BENNETT, Miami University, Oxford, OH, JORDAN KATINE, LIESL FOLKS, MATTHEW CAREY, Hitachi Global Storage Technologies, San Jose, CA — We are investigating the magnetization dynamics of a ferromagnetic system in the proximity of an unstable equilibrium. The test system utilized is permalloy in thin film and nano-scale dot geometries with the magnetization along the film normal at fields close to saturation ($4\pi M_{eff}$). For sub-critical fields ($H_{appl.} = 4\pi M_{eff}$), the magnetization equilibrates at some angle θ, but has no energy minumum in the azimuthal angle ϕ, therefore no resonance condition exists. Slight misalignment of the field removes the degeneracy in ϕ resulting in an energy minimum in both the θ and ϕ directions. This produces finite resonances at sub-critical fields. This sub-critical energy minimum resembles an asymmetrical 'bowl' that changes shape with field and misalignment angle. We model measured frequency/field dispersion curves in terms of the Landau-Lifshitz equations of motion about the equilibrium position and interpret the results in terms of the 'bowl' geometries. We also explain the observance of a local minimum, close to $4\pi M_{eff}$, resulting in the three resonances in a constant frequency/swept field scan.

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