Revisiting low-frequency ferromagnetic resonance in yttrium iron garnet thin films

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The recent expansion of the interpretative scope of ferromagnetic resonance (FMR) experiments has resulted from recognizing the essential role of the curvature of the magnetic free energy landscape in data interpretation. This study applied that concept to reinterpret low-frequency FMR measurements on a yttrium iron garnet (YIG) thin film grown along the [111] axis of its crystalographic structure, perpendicularly to the film plane. Through machine learning, we have observed that the coefficients (referred earlier to as anisotropy constants and demagnetization constants) in the expansion of the magnetic free energy into a series may depend on resonance frequency. This observation complements the older approach that assumes fixed anisotropy constants. Moreover, it leads to a more precise understanding ofthe outputs of FMR experiments, which may also have implications for their future interpretations.