



Figure 1: Inductance density of thin film spiral with the bias magnetic field applied (a) out of plane and (b) in plane. The corresponding quality factor is shown in (C). Note that the saturation magnetization of YIG in the modelling is equal to 140 kA/m (1760 G). The inset of (a) shows the physical dimensions of the thin film inductor.

References

- [1] C. Kittel, *On the Theory of Ferromagnetic Resonance Absorption*, Phys. Rev. **73**, 155 (1948).
- [2] J. L. Snoek, *Dispersion and Absorption in Magnetic Ferrites at Frequencies above One Mc/S*, Physica **14**, 207 (1948).
- [3] N. Saleh and A. H. Qureshi, *Permalloy Thin-Film Inductors*, Electron. Lett. **6**, 850 (1970).
- [4] R. Soohoo, *Magnetic Thin Film Inductors for Integrated Circuit Applications*, IEEE Trans. Magn. **15**, 1803 (1979).
- [5] K. I. Arai, M. Yamaguchi, H. Ohzeki, and M. Matsumoto, *Application of YIG Film to Thin Film Inductors*, IEEE Trans. Magn. **27**, 5337 (1991).
- [6] M. Yamaguchi, K. Suezawa, K. I. Arai, Y. Takahashi, S. Kikuchi, Y. Shimada, W. D. Li, S. Tanabe, and K. Ito, *Microfabrication and Characteristics of Magnetic Thin-Film Inductors in the Ultrahigh Frequency Region*, J. Appl. Phys. **85**, 7919 (1999).
- [7] V. Korenivski, *GHz Magnetic Film Inductors*, J. Magn. Magn. Mater. **215–216**, 800 (2000).
- [8] M. Yamaguchi, K. Hyun Kim, and S. Ikeda, *Soft Magnetic Materials Application in the RF Range*, J. Magn. Magn. Mater. **304**, 208 (2006).
- [9] D. S. Gardner, G. Schrom, F. Paillet, B. Jamieson, T. Karnik, and S. Borkar, *Review of On-Chip Inductor Structures with Magnetic Films*, IEEE Trans. Magn. **45**, 4760 (2009).
- [10] Y. Elasser, H. Li, P. Wang, J. Baek, K. Radhakrishnan, S. Jiang, H. Gan, X. Zhang, D. Giuliano, and M. Chen, *Circuits and Magnetics Co-Design for Ultra-Thin Vertical Power Delivery: A Snapshot Review*, MRS Adv. **9**, 12 (2024).
- [11] G. Ezhilarasu and S. S. Iyer, *Integrated Micro-Capacitors and Micro-Inductors for Next Generation Electronics*, IEEE Nanotechnol. Mag. **18**, 30 (2024).
- [12] T. Tsutaoka, T. Kasagi, and K. Hatakeyama, *Permeability Spectra of Yttrium Iron Garnet and Its Granular Composite Materials under Dc Magnetic Field*, J. Appl. Phys. **110**, (2011).