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Growth of High-Quality Yttrium Iron Garnet Thin Films on Metallic Thin Layers YIYAN SUN, YOUNG-YEAL SONG, MINGZHONG WU, DEPARTMENT OF PHYSICS, COLORADO STATE UNIVERSITY TEAM — Yttrium iron garnet (YIG) is one type of ferrite materials that has the lowest loss at microwave frequencies. One typically grows YIG on gadolinium gallium garnet (GGG) substrates, and this is typical mainly because of the perfect matching between the YIG and GGG lattice constants. For applications in monolithic devices, however, one needs to grow YIG films on metallic conductors or electrodes. This presentation reports the deposition of YIG thin films on metallic thin layers and the optimization of the deposition procedures. The metallic and YIG films were deposited by pulsed laser deposition and magnetron sputtering techniques and were characterized by scanning electron microscopy, x-ray diffraction, and ferromagnetic resonance measurements. The work shows rather clearly the critical roles of the selection of metallic materials, the thickness of the metallic layers, the deposition temperature, and the use of buffer layers on the deposition of high-quality YIG films.

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