

Abstract Submitted
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Magnetic Nano Films and Devices for Millimeter Wave Communications¹ MITCHELL KNAUB, Colorado State University — Magnetic devices that operate in the microwave regime have revolutionized the wireless communications industry. Devices such as phase shifters and circulators are vital components in wireless phones, satellites, and radar; however, there is focus on these devices to push the operating frequencies to the millimeter wave regime. The push to millimeter wave devices entails wireless communication to easily penetrate thick clouds and dust, where microwaves could not. The strategy to push millimeter wave devices begins with ferromagnetic thin films. Metallic films are a prime candidate because of their high magnetization, and thus, higher ferromagnetic resonance (FMR) frequencies. The FMR frequency is what ultimately determines a devices operating frequency. Another strategy to produce high FMR frequencies in films without a large static field is to induce surface spin-wave pinning. By pinning the spin waves, it is possible to induce secondary FMR modes (at the same high frequency as un-pinned modes) which require a lower static magnetic field. This would allow millimeter wave devices to operate at higher frequencies as well as meeting size and weight requirements.

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