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Spin pumping in electrodynamically coupled magnon-photon systems

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We use electrical detection, in combination with microwave transmission, to investigate both resonant and non-resonant magnon-photon coupling at room temperature. Spin pumping in a dynamically coupled magnon-photon system is found to be distinctly different from previous experiments. Characteristic coupling features such as modes anti-crossing, line width evolution, peculiar line shape, and resonance broadening are systematically measured and consistently analyzed by a theoretical model set on the foundation of classical electrodynamic coupling. Our experimental and theoretical approach pave the way for pursuing microwave coherent manipulation of pure spin current via the combination of spin pumping and magnon-photon coupling.

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