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Abstract:Ultrafast demagnetization processes in ferromagnetic films have been shown to produce terahertz (THz) emission. We present an experimental demonstration that, following ultrafast optical excitation, the magnitude of terahertz electromagnetic pulses emitted from a ferromagnetic film is proportional to the Gilbert damping constant, which is conventionally used to describe the damping of magnetization precession. The damping of a ferromagnetic thin film is tuned by using an adjacent nonmagnetic layer, which does not change the magnetization and anisotropy of the ferromagnetic film, allowing an unambiguous determination of the relationship between the THz emission and the damping constant. © 2012 American Institute of Physics.
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