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Magnets satisfy the Landau-Lifshitz equation AND the Bloch equation. WAYNE SASLOW, Texas AM University — Magnets possess distinct contributions to their magnetization. On the one hand, the magneization direction is associated with a quantization axis, and has an associated the equilibrium magnitude M. On the other hand, the excitations – when the system is out of equilibrium – are specified by a distribution function with moments that can yield an additional, non-equilibrium magnetization contribution, called the spin accumulation m. This is true for both conductors and insulators. The direction of the quantization axis satisfies the Landau-Lifshitz equation, and with irreversible thermodynamics one can show that the spin accumulation m satisfies a Bloch equation with diffusion. The boundary conditions on the magnetization direction follow from the equations of motion evaluated at the boundaries. The boundary conditions on the spin accumulation m involve the spin flux, and are a generalization of the equation for the bulk spin flux.

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