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Non-Adiabatic Spin Transfer Torque in Realistic Materials ION GARATE, ALLAN MACDONALD, University of Texas at Austin — The motion of simple domain walls and more complex magnetic textures in the presence of a transport current is sensitive to the size and sign of the non-adiabatic spin transfer torque coefficient β, even though this dimensionless coefficient is believed to typically have a small value. The ratio of β to the Gilbert damping coefficient α is particularly important and has been variously estimated to be close to 0, close to 1, and large or small. By identifying β as following from the influence of a transport current on α, we derive concise analytical expressions for β in real materials. When spin-orbit is included in the band structure, the damping has an intra-band contribution that is proportional to the square of the quasiparticle lifetime. We will discuss estimates for β and for the α/β ratio in common magnetic materials.

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