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Inhomogeneous Gilbert damping from disorder and electron-electron interactions[1] EWELINA HANKIEWICZ, Fordham University, GIOVANNI VIGNALE, University of Missouri-Columbia, YAROSLAV TSERKOVNYAK, University of California Los Angeles — We present a unified theory of Gilbert damping in itinerant ferromagnets at order q^2 (q being the wave vector of the spin modulation) including electron-electron interactions and electron-impurity scattering – the idea being that these interactions are much stronger than the spin-orbit interaction, which controls the damping in the homogeneous case ($q = 0$). We show that Gilbert damping can be expressed in terms of the spin conductivity, which can be calculated straightforwardly (no vertex corrections involved) leading to a Drude-like formula in which the inverses of the disorder and interaction scattering times enter in a simple additive form. We also make contact with earlier theories of the transverse spin susceptibilities and with the spin-pumping picture of the Gilbert damping.

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