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Dynamical spin susceptibility of a spin-polarized two-dimensional electron liquid with Rashba spin-orbit interaction[1] GIOVANNI VIGNALE, RUBEN PORTUGAL, University of Missouri — It has recently been shown[1] that a macroscopic equation of motion for the magnetization of an inhomogeneous electron liquid can be derived from the dynamical spin susceptibility of the latter. This equation of motion includes dissipation due to the coupling between the macroscopic magnetization and more microscopic degrees of freedom. However, a calculation based on the homogeneous spin-polarized electron liquid without spin-orbit coupling fails to produce a realistic model of dissipation, since the dissipative terms vanish at low temperature and/or for global rotations of the magnetization. As a first step towards a realistic theory of dissipation we present a mode- coupling calculation of the dynamical spin susceptibility of a spin- polarized two-dimensional electron liquid in the presence of a spin-orbit interaction of the Rashba form. The equation of motion for the magnetization derived from this spin susceptibility contain a dissipative term of the form that is usually described by the Gilbert damping constant. This and other features of the resulting spin dynamics will be examined in detail.

1. Z. Qian and G. Vignale, PRL 88, 056404 (2002)

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