# SPIN DYNAMICS OF FERROMAGNETIC SPIN GLASS

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9.7 cm

In the ferromagnetic spin glass (FSG) positions and directions of spins are randomly distributed, but the system has a finite spontaneous magnetization $\mathbf{M}$ whose value, at zero temperature, however, differs considerably from the nominal value. Recently the interest to FSG is rapidly growing because of similarity between FSG and ferromagnetic-like phase in magnetic semiconductors- materials whose magnetic properties can be easily control-ed by the electronic parameters and vice versa. In FSG, in opposite to a conventional ferromagnet, the dynamically induced magnetic moment $\mathbf{m}$ essentially affects spin dynamics, because of the relatively small value of $\mathbf{M}$. In a macroscopic description $\mathbf{m}$ can be treated as the spin of a vectorial field $\vec{\varphi}$ that describes rotation of spins with respect to a lattice. Since FSG is the low temperature phase the quantum effects are important in FSG. Starting with the phenomenological Lagrangian of the field $\vec{\varphi}$ in FSG we have derived the Hamiltonian of FSG and then canonically quantized the field $\vec{\varphi}$. It allows for the description of FSG spin dynamics at $T \neq 0$, the inclusion of spin waves interaction, and correct inclusion of a dissipation in the system by taking into account the damping of spin waves. Using Green functions technique for $T \neq 0$ the dynamical susceptibility of FSG and the cross section for inelastic neutron scattering has been calculated. Because of the quadratic dispersion law of spin waves in FSG the $\mathbf{q}$ vector and temperature dependence of those quantities are like the convectional ferromagnets.

13.4 cm

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