Spin Diffusion Cofficient of A Phase of Liquid ^3He at Low Temprature and Stable Half Quantum Vortex

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We theoretically investigate the spin diffusion coefficient tensor in the A phase of liquid ^3He in term of quasiparticle life-time by using the Kubo formula approach at low temperatures. In general the coefficient is a fourth rank tensor for the anisotropic states and can be defined as a function of spin current normal component in the superfluid state and magnetization. The quasiparticle life- time is obtained by using the Boltzmann equation. We find that components of the spin diffusion coefficient are proportional to T^{-2} at low temperatures. The normal components of spin current, hence, are strongly diffusive and one can ignore the contribution of these components to the stability of half quantum vortices ($HQVs$) in the equal-spin-pairing of ^3He-A state. So to make a HQV stable, It is enough one considers weak interaction and effects of Landau Fermi liquid.