would seem that conductivity will affect the microwave response for $\mu_0\sigma\omega$ values comparable with k^2, i.e. for spin waves with wavelengths $2\pi/k$ comparable to the microwave skin depth in the material $\sqrt{2/(\mu_0\sigma\omega)}$. However, as shown by Almeida and Mills [16], the range of affected in-plane wavenumbers is considerably larger. The important parameter turns out to be the microwave *magnetic* skin depth l_{sm} which can be considerably smaller than the classical skin depth $l_{sc} = \sqrt{2/(\mu_0\sigma\omega)}$, especially at frequencies and applied fields close to those for the in-plane ferromagnetic resonance.

The dynamic fields are related by the microwave magnetic susceptibility tensor $\hat{\chi}$, defined by $\mathbf{m}_k = \hat{\chi}\mathbf{h}_k$. The susceptibility can be found from the linearised Landau-Lifschitz-Gilbert equation [26]. This, together with Eqs. (1) and (2) form a system of equations with solution $\mathbf{m}_k, \mathbf{h}_k \propto exp(\pm Qy)$. The out-of-plane wavenumber Q is larger than the corresponding insulating value (k), and is also larger than the quantity $\sqrt{k^2 i\mu_0 + \sigma\omega}$ appearing in Eq.(2). The imaginary component of Q^2, and the actual magnetic skin depth, are "amplified"' by the off diagonal susceptibility (or magnetic gyrotropy) χ_a: $l_{sm} = l_{sc}/\sqrt{\mu_V}$, and $Q = \sqrt{k^2\mu_0 - i\mu_V\sigma\omega}$, where $\hat{\mu} = \hat{1} + 4\pi\hat{\chi}$ and $\mu_V = \frac{\mu^2+\chi_a^2}{\mu}$ [16].

Ferromagnetic resonance in our geometry represents homogeneous precession $k = 0$. In the absence of magnetic losses at the resonance frequency, the diagonal component of the permeability tensor vanishes ($\mu = 0$). However the off diagonal component μ_a responsible for gyrotropy does not vanish at resonance. This results in divergence of μ_V at resonance.

In real materials μ_V is bounded due to magnetic losses, but nevertheless l_{sm} is nearly an order of magnitude greater than l_{sc} for Permalloy films. For $k > 0$ the conductivity contribution to Q becomes less important, but still large. This effect is shown in Fig. 2a. From this figure one sees that spin waves with in-plane wave numbers up to 40000 rad/cm are affected by the conductivity.

The consequences for resonant absorption due to this enhanced skin depth appear when one considers the stripline geometry. Spin waves are excited within an area in which the transducer's magnetic field is largest. They travel out of this region, mostly in directions perpendicular to the transducer axis. It is known that spin waves are excited by stripline transducers resonantly, so that a microwave field of the frequency ω excites a spin wave with the same frequency (see e.g.[21, 28–30]) with in-plane wavenumber k determined by the spin wave dispersion $\omega(k)$. The amplitude of an excited spin wave with wavector k is proportional to the amplitude of the corresponding spatial Fourier-component of the