

## Probing the magnetic state of nanoparticles with the technique of magnetic resonance

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The linewidth, the resonance field, and the intensity of the magnetic resonance (MR) spectra are sensitive to the magnetic transitions. Hence, the technique of MR is very effective to probe different magnetic phases. In this work, the MR results on the nanoparticles of  $\text{Fe}_3\text{O}_4$  and  $\text{La}_{0.7}\text{Sr}_{0.3}\text{MnO}_3$  with distinct diameters synthesized with different chemical methods are presented. Our results clearly demonstrate a difference in the dynamic behaviors of resonance field ( $H_r$ ) and resonance linewidth between these nanoparticles. Further analysis prevails that the non-linear temperature dependency of  $H_r$  suggests that the surface anisotropy and disorder become dominating on the magnetodynamics of nanoparticles when the diameters of nanoparticles are smaller than the critical size.

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