

Magnetic nanoparticles: “supermagnetism” regimes

Davide Peddis

ISM-CNR, Roma (Italy)

1) Single particle behaviour¹⁻³

1a) Finite size effect (superparamagnetism)⁴⁻⁶

1b) Magnetic Structure of nanoparticles (surface effects)^{5,7,8}

1c) Magnetic anisotropy in nanoparticles^{1,2,9}

1d) interface effects (exchange bias) in core/shell nanoparticles¹⁰⁻¹³

2) Magnetism of nanoparticle assemblies: Supermagnetism¹

2a) weak interactions regime (models).^{3,14,15}

2b) strong interactions regime: superspinglasses¹⁶⁻¹⁹ and superferromagnetism^{1,20,21} (models; critical behaviour; out of equilibrium dynamics: aging and memory effects¹⁸)^{1,8,19}.

3) Why to study magnetic nanoparticles?²

3a) Applications^{23,24}

3b) Magnetic nanoparticles in Nature²

Red: Fundamental articles

Yellow: “Historical” paper

Blue: Specific Literature

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5. X. Batlle, and A. Labarta. *Finite-Size Effects in Fine Particles: Magnetic and Transport Properties. J. Phys. D. Appl. Phys.* R15 (2002).
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14. D. Fiorani, and D. Peddis. *Understanding Dynamics of Interacting Magnetic Nanoparticles: From the Weak Interaction Regime to the Collective Superspin Glass State*. *J. Phys. Conf. Ser.* (2014).
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