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Modification of ground state property on size reduction to 1D

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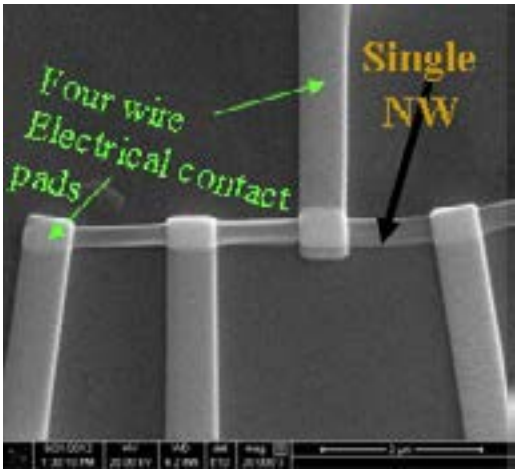
Nanowires, because of their unique one-dimensional like structural characteristics and size effects, exhibit many novel physical properties, that are different from their bulk counterparts. Main motivation of our investigation is to show, how size reduction affects competing interactions in complex oxides and thus, changes their ground state. Magnetization measurement on half doped manganite nanowire shows several magnetic transitions which are different from bulk. Understanding of magnetic transitions done using several experiments like magneto caloric study, Neutron diffraction study, which shows the presence of phase coexistence of magnetic phases (antiferromagnetic and ferromagnetic).As the experiments are carried out on ensemble of nanowires, question may arise whether the phase coexistence observed in nanowires is due to size dispersion. To answer this question, instead of ensemble of nanowires, noise spectroscopy study of single nanowire (<50 nm) level is done to demonstrate how the noise spectroscopy can explain the magnetic transitions and phase separation.Field dependent as well as temperature dependent noise spectroscopy study was done on a single nano-wire to avoid the problems of size dispersion with the specific aim of corroborating the magnetic phase transitions as well as phase co-existence at a single NW level. I would discuss briefly on how to grow nano structured material and about the experiments both in ensemble and single nanowire of perovskite oxides. Experiments with single nanowires; mainly on fabrication of single nanowire based devices, using different lithographic techniques challenges would be discussed.



Biography

Dr. Barnali Ghosh (Saha), is now a Scientist-E, (Associate Professor) in the Department of Condensed Matter Physics and Material Sciences and Head of the department of Technical Research facility programme. She is a member of Indian Physics Association. She got Ph.D degree in Physic award in 1998. She got a research Award in Woman Scientist programme in 2003 and 2008 from "Department of Science and Technology, Government of India". Currently Dr. Barnali Ghosh (Saha)'s researches focus on experimental condensed matter Physics and Nano Science and nanotechnology, Physics of transition metal oxides mainly perovskite oxides. She is also working on fabrication of single nanowire based devices using different lithographic techniques like, e-beam and focused ion beam techniques and transport measurement on single nanowire. She also does cross sectional transmission electron microscopy relate work using focused ion beam based techniques.

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