



# Physik-Kolloquium

**Dienstag, den 07.05.2019, 17.00 Uhr**

## **Professor Arup Kumar Raychaudhuri**

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Salt Lake City, Kolkata, India

### **Metal- Insulator transition revisited**

The physics of metal-insulator transition is one of the most fascinating phenomena in modern-day solid state sciences. It well researched for years till remains an open question. The process of transition from a metal (which has extended states) to an insulator (that has localized states) is not explainable within the frame work of a comprehensive theory, where disorder and electron correlation effects can be present together. In these schemes of things, oxides that show a temperature driven metal-insulator transition, form a special class have very highly resistive metallic phase co-existing with insulating phase in the transition region. This talk will present an account of experimental pursuits, that allow us to get some new perspectives of the metal-insulator transition in oxide films close to the transition region where co-existence of phases play an important role. The discussion will be on oxide materials like manganites<sup>1</sup>, VO<sub>2</sub><sup>2</sup> and NdNiO<sub>3</sub><sup>3,4</sup>. In particular, we will show results using Scanning Probe Microscopy/Spectroscopy as well as 1/f noise spectroscopy done across the transition region where the static and dynamic nature of the phase coexistence can be probed.

1. "Non-Gaussian resistance noise in the ferromagnetic insulating state of a hole-doped manganite" PHYSICAL REVIEW B 85, 045127 (2012)
2. "Dynamic phase coexistence and non-Gaussian resistance fluctuations in VO<sub>2</sub> near the metal-insulator transition". PHYSICAL REVIEW B 92, 195125 (2015)
3. "Phase co-existence near metal-insulator transition in a compressively strained NdNiO<sub>3</sub> grown on LaAlO<sub>3</sub>: Scanning tunneling, noise and impedance spectroscopy studies". PHYSICAL REVIEW B 95, 115147 (2017)
4. "Continuous transition from weakly localized regime to strong localization regime in Nd<sub>0.7</sub>La<sub>0.3</sub>NiO<sub>3</sub> films" J. Phys.: Condens. Matter 31 145603 (2019)

**Ort: Hörsaal für Theoretische Physik, Linnéstraße 5**

**Alle Teilnehmer sind ab 16.30 Uhr zu Kaffee vor dem Hörsaal eingeladen.**