

# Physics Colloquium

Michigan Technological University

Thursday, September 27, 2012

4:00 pm

Room 139 Fisher Hall



## Nano-Magnets and Nano-wires

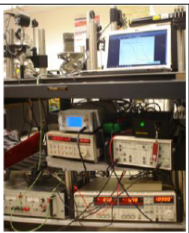
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**Abstract:** In recent years there has been a significant effort to develop new lower-dimensional solid state structures such as nano-particles, nano-wires, thin and ultra-thin films with optical, electronic, and magnetic characteristics governed by quantum mechanics. Understanding these structures is extremely important in order to probe size effects, surface and interface physics as well as to develop new technologies. The quest to develop new technologies is at the heart of materials physics research. The structure-property relations are determined by the conditions under which materials are grown. In this presentation a synopsis of several methods for filling carbon nano-tubes (CNTs) with magnetic nano-particles and characterization results will be discussed.

### Magneto-Optic Kerr Effect (MOKE)



1. Laser
2. Optical Chopper
3. Electromagnet
4. Polarizer
5. Analyzer
6. BOP Power Supply
7. Photo Diode
8. SRS Preamplifier
9. Keithley Picoammeter
10. SRS Lock-in Amplifier
11. Laptop with control software

Fig. 1: MOKE setup at Morgan State University.

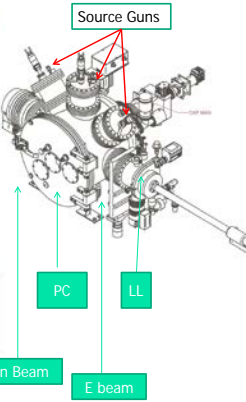
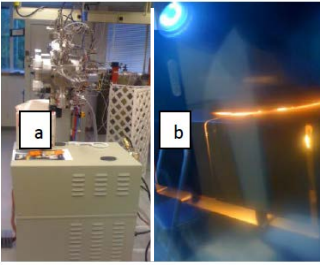


Fig. 2: (a) Magnetron dc sputtering system. (b) Inside processing chamber during deposition at high temperature.

Labels: Source Guns, PC, LL, Ion Beam, E beam

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**Biography:** Dereje Seifu received his B.Sc. in 1982 and M.Sc. in 1985 in Physics from Addis Ababa University in Ethiopia, and Ph.D. in physics from the University of Cincinnati, Ohio, USA. At Present Dr. Seifu is an associate professor of physics at Morgan State University in Baltimore, Maryland. He has authored 14 articles in peer reviewed journals on magnetism in materials.