

**Center for Quantum Science and Engineering (CQSE)
&
National Center of Theoretical Sciences (NCTS)**

**Joint Seminar
April 9, 2010 (Friday)**

Time: April 9, 2:30pm ~ 3:30pm

Title: LARGE AREA ELECTRONICS: from silicon to oxide electronics

Speaker: Prof. Jian Z. Chen (陳建彰)

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Place: Rm716, CCMS & New Physics Building, NTU

Abstract

Different from single crystalline semiconductor technology, amorphous and polycrystalline semiconductors are suitable for large-area electronics. Their main applications include solar cells and active-matrix (AM) flat-panel displays. Amorphous or polycrystalline thin films with areas of greater than 1 m^2 can be easily grown at low temperature on organic polymer foil substrates which leads to a new area of application called flexible electronics.

Hydrogenated amorphous silicon (a-Si:H) technology is the current industrial standard for large-size electronic applications. However, its electron mobility is limited to $1 \text{ cm}^2\text{V}^{-1}\text{sec}^{-1}$. Lots of research efforts have been put in to increase the carrier mobility, by introducing directly-deposited nanocrystalline silicon, excimer laser annealed polycrystalline silicon, or transition metal oxide semiconductors as alternatives for a-Si:H. In this presentation, at first, I will introduce the current status of inorganic large area electronics. Then I will discuss our recent research results on the 2DEG in defective rf-sputtered MgZnO/ZnO heterostructures and high speed MgZnO/MgO transistors.

