

# T<sub>C</sub>SUH Special Seminar

Texas Center for Superconductivity at the University of Houston



## Dr. Lin Shao

Center for Integrated Nanotechnologies  
Los Alamos National Laboratory  
Los Alamos, NM

### “The approach for nanolayered semiconductor-on-insulator”

**April 6, 2006**

Room 102, University of Houston Science Center

12:00 noon – 1:00 p.m.

#### Abstract

The creation of ever higher density chips with faster speeds and lower power consumption is one of the major goals being persistently pursued by the microelectronics industry. Device integration on silicon-on-insulator (SOI) wafers offer a sustainable, long-term pathway for scaling various devices such as sensors, photodiodes, and most importantly, complementary metal oxide semiconductor (CMOS). Fabrication of SOI wafers is typically performed using an ion-implantation-based technique in which implanted hydrogen atoms react with broken silicon bonds and create hydrogen-filled microcracks which can propagate in a direction parallel to the wafer surface. The top Si layer is then split apart and bonded to an oxide layer, to form SOI wafers. However, there are technical challenges for the fabrication of nanolayered SOI wafers, with the top Si layer less than 100 nm thick. We have recently developed novel approaches to transfer an ultrathin Si layer by using a buried strained layer or highly doped layer to provide H trapping centers during hydrogenation, with following advantages: 1) The crack location can be controlled by adjusting the position of the H-trapping layer; and 2) the crystalline quality of the transferred layer is greatly improved due to reduced irradiation damage. We have realized the lift-off of a Si layer with a thickness of 15 nm, which is not achievable by previous techniques. This talk will give an overview of the status and perspective of ion cutting techniques.

#### Brief Bio

Lin Shao is a postdoctoral researcher at Los Alamos National Laboratory (LANL) where he has been since 2004. He received his B.S. degree in Physics from Beijing University (1997) and his Ph.D. degree (2001) in Physics from the University of Houston under the guidance of Wei-Kan Chu. He was then a postdoctoral researcher in the same group before accepting his current position. He has published more than 70 papers and holds 7 patents or patent applications.

*Persons with disabilities who require special accommodations in attending this lecture should call (713) 743-8210 as soon as possible.*



TEXAS CENTER FOR  
SUPERCONDUCTIVITY