



3rd TcSUH STUDENT/POSTDOC SEMINAR

December 3, 2018 - 5:30 p.m., HSC 102

Food and soft drinks will be served!!

Massless Higgs Mode in Fulde–Ferrell–Larkin–Ovchinnikov State

Dr. Zhao Huang

TcSUH and Department of Physics

Abstract: In superconductors, the Higgs mode is a fundamental collective excitation, which describes the dynamics of the amplitude fluctuation of the superconducting order parameter. The masses of the Higgs modes are finite for uniform superconductors. In the Fulde–Ferrell–Larkin–Ovchinnikov state where the superconducting order parameter is inhomogeneous but periodic in real space, we find a massless Higgs mode. In this seminar, background of various collective modes in superconductors will also be introduced.

Bio: Dr. Zhao Huang is currently a Postdoc in Dr. Chin-Sen Ting's group in the department of Physics and Texas Center for Superconductivity at University of Houston.

Single Junction GaAs Thin Film Solar Cells on Flexible Epi-ready Metal Tape for Low Cost Photovoltaics

Devendra Khatiwada

TcSUH, Advanced Manufacturing Institute and Department of Mechanical Engineering

Abstract: Thin film solar cells have increasing demand in photovoltaics industry due to their advantages including low cost, mechanical flexibility, lightweight, wide range of applications and easy scalability. III-V semiconductor materials like GaAs are a good candidate for thin films photovoltaics. These materials have a high absorption coefficient in the relevant energy range for photovoltaics and can absorb most of the sunlight within a few micrometer thickness, beneath their surface which can reduce the material cost. The highest efficiencies have been reported in III-V solar cells based on GaAs wafers however their application has been very limited due to high cost of these wafers. We have developed a technology to fabricate III-V solar cells on high quality epitaxial semiconductor thin films on low-cost flexible metal tapes to overcome the high wafer cost.

In our process, metal organic chemical vapor deposition (MOCVD) is used to epitaxially grow GaAs solar cell structure on single-crystalline-like germanium thin films grown on epi-ready flexible metal template. The grown device architecture is further processed for contact deposition via photolithography.

The fabricated thin film III-V solar cells show promising photovoltaic performance under A.M 1.5 (1 sun). Photon conversion efficiency greater than 11% was observed with open circuit voltage (Voc) of 642mV, short circuit current density (Jsc) of 25mA/cm² and fill factor of 70%. Further improvement in device efficiency is pursued with new device architectures, optimization of film growth parameters and improvement of device fabrication processes.

Bio: Mr. Devendra Khatiwada is currently a Ph.D. student in Dr. Venkat Selvamanickam's group in the department of Mechanical Engineering and Texas Center for Superconductivity at University of Houston.

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Persons with disabilities who require accommodations to attend this seminar should call 713-743-8213.