



# 1<sup>st</sup> TcSUH STUDENT SEMINAR

Monday, October 8, 2018

5:30 p.m. – HSC 102

*Pizzas and soft drinks will be served!!*

**Welcome:** Dr. Zhifeng Ren, TcSUH Director, and TcSUH Student Seminar Committee Co-Chairs

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## High Thermal Conductivity Boron Arsenide: from Prediction to Reality

**Dr. Fei Tian**

TcSUH and Department of Physics

**Abstract:** Conventional theory predicts that ultrahigh lattice thermal conductivity can only occur in crystals composed of strongly-bonded light elements, and that it is limited by anharmonic three-phonon processes. We report experimental evidence that is a departure from these long-held criteria. We measured a local room-temperature thermal conductivity exceeding  $1000 \text{ W m}^{-1} \text{ K}^{-1}$  and an average bulk value reaching  $900 \text{ W m}^{-1} \text{ K}^{-1}$  in bulk boron arsenide (BAs) crystals, where boron and arsenic are light and heavy elements, respectively. The high values are consistent with a proposal for phonon band engineering and can only be explained with higher order phonon processes. These findings yield new insight into the physics of heat conduction in solids and show BAs to be the first known semiconductor with ultrahigh thermal conductivity.

**Bio:** Dr. Fei Tian is currently a Postdoc Researcher in Dr. Zhifeng Ren's group in the Physics department and Texas Center for Superconductivity at University of Houston.

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## Thin Film Deposition and Characterization by Molecular Beam Epitaxy (MBE) – Low Temperature Scanning Tunneling Microscopy (STM)

**Hanming Yuan**

TcSUH and Department of Physics

**Abstract:** MBE system can precisely control the source flux and thus can achieve layer-by-layer deposition of thin film with atomic precision. In the meanwhile, LT-STM system can study the surface morphology and the  $dI/dV$  spectra of the thin film to reveal its electronic properties. In this talk, I will introduce the capability of our system and how we grow and characterize the monolayer FeSe ultra-thin film on  $\text{SrTiO}_3$  substrate that shows the interface induced superconductivity.

**Bio:** Mr. Hanming Yuan is currently a Ph.D. student in Dr. Paul Chu's group in the Physics department and Texas Center for Superconductivity at University of Houston.

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**RSVP:** [tcsuhstudents@uh.edu](mailto:tcsuhstudents@uh.edu)

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