Materials Engineering Program

Texas Center for Superconductivity at the University of Houston

Center for Integrated Bio and Nano Systems

Enabling Ambient Sodium Sulfur Batteries

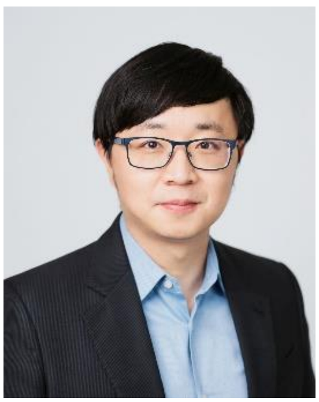
February 09, 2024

In Person Only, 1:00 – 2:00 pm

Houston Science Center (HSC), Rm.102

Dr. Liangzi Deng

Department of Physics and Texas Center for Superconductivity
University of Houston



Abstract:

The search for superconductors with a higher transition temperature (T_c) has been one of the major driving forces in the long-sustained research effort on superconductivity ever since its discovery in 1911. The discovery of $YBa_2Cu_3O_7$ with a T_c ~ 93 K in 1987 by Prof. Ching-Wu Chu at the University of Houston and co-workers ushered in the modern era of high-temperature superconductivity (HTS). Since 1994, all record T_cs have been set under high-pressure, which hampers both the application of the record-setting materials and the measurement of their key physical properties. To overcome this hurdle, Dr. Deng and colleagues have developed a pressure-quenching technique to retain metastable phases by taking advantage of energy barriers, similar to the formation of diamond. In this talk, Dr. Deng will discuss their recent breakthrough on the successful retention of pressure-enhanced and/or -induced superconducting phases at ambient pressure in multiple systems. Additionally, Dr. Deng will introduce their efforts to search for HTS *via* the interface mechanism and to discover novel materials with favorable physical properties using different synthesis techniques.

Bio: Dr. Liangzi Deng currently serves as a Research Assistant Professor of Physics at the University of Houston (UH). He obtained his Ph. D. in Physics from UH in 2015, and his thesis advisor was Prof. Ching-Wu Chu. His main research interests are searching for novel superconductors and topological materials; enhancing superconducting critical transition temperatures; unraveling the underlying mechanism and developing the practical use of high-temperature superconductivity; investigating strongly correlated systems with multi-interactions; and designing revolutionary tools to accelerate discovery and technological deployment of quantum materials. His recent leading work on superconductors and topological solids has resulted in several publications, including three in *Proceedings of the National Academy of Sciences*, two in *Materials Today Physics*, and one in *Nature Communications*. He has also collaborated on studies of two-dimensional materials and thermoelectric compounds that have been published in *Nature Nanotechnology*, *Science Advances*, and *Science*.