Department of Electrical and Computer Engineering

TEXAS TECH UNIVERSITY
Edward E. Whitacre Jr.
College *of* Engineering

Spring 2024 Seminar Series

Seminar Title: ***Characterization and Searching New 3D Topological Correlated Insulators***

Time: 2:00-2:50 PM, Friday, Feb 16, 2024
Location: Holden Hall 150

Speaker:
Yun Suk Eo
Department of Physics and Astronomy, TTU

Abstract:
Two-dimensional electron gas (2DEG) systems serve as a promising platform for both practical applications and the exploration of fundamental aspects in condensed matter physics. This versatile platform is realized through semiconductor heterostructures, 2D materials, and the surfaces of 3D topological insulators (3D TI). While 3D TIs are intriguing, many are not genuine bulk insulators, making access to the 2D surface channel challenging via electrical transport. Another class of 2D systems, known as topological correlated insulators (e.g. samarium hexaboride), presents a promising alternative and has further interesting properties such as intrinsic magnetism. In contrast to 3D TIs, topological correlated insulators are nearly perfect insulators even in poor crystal quality samples, allowing easy access to 2D surface states. However, conventional techniques like Hall measurements are ineffective for their characterization. In this presentation, I will tell a story of how our understanding evolved and lead to developments new transport techniques such as the inverted resistance measurement. Additionally, a brief overview of recent progress in identifying new topological correlated insulator candidates and insights into our future research direction will be provided.

Speaker Bio:
Dr. Yun Suk Eo is an Assistant Professor at Texas Tech University, joined in August 2023. Previously, he held a position as a postdoctoral researcher at the Quantum Materials Center at the University of Maryland, working under the mentorship of Professor Johnpierre Paglione and Professor Michael S. Fuhrer (Monash University). Yun Suk Eo completed his Ph.D. at the University of Michigan, Ann Arbor in 2017, under the guidance of Professor Cagliyan Kurdak. His research interests primarily focus on exploring electrical and thermal transport properties in topological correlated materials.