Micro&Opto Electronics Seminars

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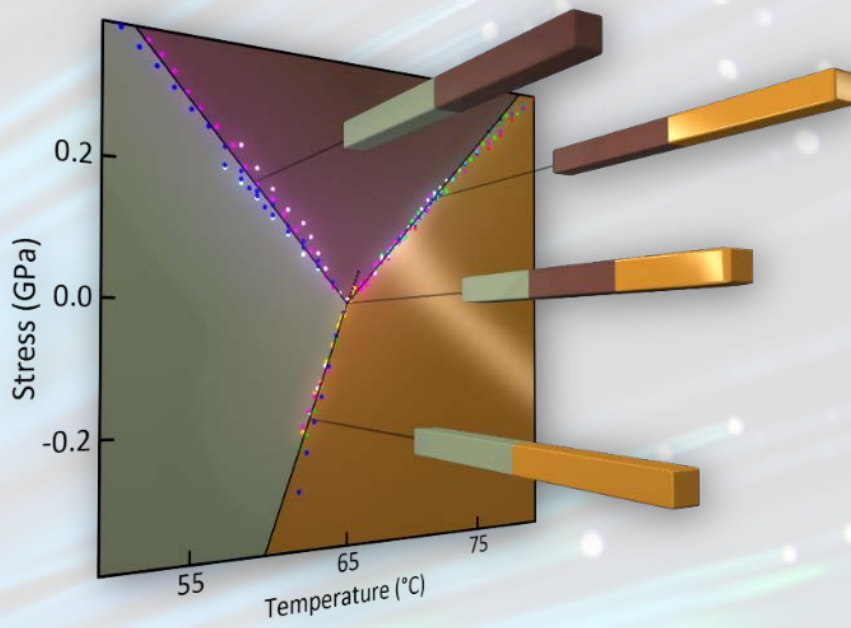
Electronic correlations in nanomaterials

by Asst. Prof. Serkan Kasırga

Abstract

Strong electronic correlations among various degrees of freedoms in solids result in the emergence of fascinating phenomena. To name a few we can list metal-insulator transitions, charge density wave transitions and superconductivity. However, these phenomena are notoriously difficult to study experimentally as they are typically associated with phase transitions that are extremely sensitive to the defects and impurities in the materials. In this talk, I will present our efforts to understand the phase transitions in some exemplary materials and present a journey from materials synthesis to characterization of the properties via electrical, mechanical and optical methods.



In particular, I will focus on the compounds of group VB elements with oxygen, sulfur and selenium. First, I will talk about how we synthesize the materials in a unique setup that allows real-time optical observation of the crystal synthesis. Then, I will talk about the effect of thickness on the phase transitions and how we use light to measure certain properties of the correlated materials.

About the speaker

Dr. Kasırga got his bachelor's degree from Bilkent University in 2009 and moved to the University of Washington for his Ph.D. There he worked on the phase transition in vanadium dioxide and two-dimensional materials. Since the beginning of 2014, he is working as a principal investigator at the National Nanotechnology Research Center (UNAM) in Bilkent University. His current research interests span from the synthesis of correlated electronics materials in their nanowire and nanoplate forms to their characterization with electrical, magnetic, mechanical and optical tools. Dr. Kasırga has been serving as the associate director of UNAM since 2015 and co-affiliated with the Department of Physics since 2016.

Date and Time: 19 December 2019, 16:00

Place: Seminar Room A