Notice and Invitation

Oral Defense of Doctoral Dissertation

The Volgenau School of Engineering, George Mason University

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Thermoelectric Properties of Novel One-dimensional and Two-dimensional Systems Based on MoS_2 Nanoribbons and Sheets

Wednesday, March 1st, 2017 10:30 am

Room 3507 Engineering Building

All are invited to attend.

Committee

Dr. Qiliang Li, Dissertation Chair

Dr. Dimitrios Papaconstantopoulos

Dr. Dimitris Ioannou

Dr. Rao Mulpuri

Dr. Albert Davydov

Abstract

Transition Metal Dichalcogenides are a new member of low-dimensional materials. Some members of this class of materials are semiconductor. Presence of electronic band gap and low-dimensionality make these materials a subject of intense research for various applications. Molybdenum di-sulfide (MoS_2) is one of the most established member of these materials due to its stability, abundance in nature and desirable electronic band gap size.

In addition to desirable electronic properties, MoS_2 has a large Seebeck coefficient, a crucial property for thermoelectric purposes. Thermoelectricity is conversion of thermal energy to electricity. Using thermoelectric generators, scattered sources of wasted heat can be collected and converted to electricity.

In this work, thermoelectric properties of novel two-dimensional systems based on MoS_2 sheets and one-dimensional systems based on MoS_2 nanoribbons have been studied. Armchair and zigzag orientation showed anisotropy in thermoelectric properties. Reducing dimensionality from sheets to nanoribbons lead to rise of electronic edge states. These edge states will enhance thermoelectric performance of MoS_2 nanoribbons in comparison to sheets.