Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Comprehensive Studies of NbS_2 and the Affects of Nb Doping in the Layered Systems of WS_2 and MoS_2 BRIAN COOPER, MAURICIO TERRONES, TOM MALLOUK, CAMDEN HENDERSON, NINA I. KOVTYUKHOVA, The Pennsylvania State University — Research on layered dichalcogenides (compounds of the form MX_2, with M as a metal and X as any member of group 16 in the periodic table) has picked up momentum due to a sympathetic reverberation created in response to the enormously prodigious research in graphene. Although much progress in graphene research has been made, there are still many hurdles to clear, and prudence has made requisite parallel courses in research. Layered dichalcogenides exhibit similar features to graphene; namely they are relatively easy to exfoliate, and have hexagonal symmetries, but unlike graphene, these compounds represent a spanning set of the materials under investigation in various scientific branches (*e.g.* superconductors, semiconductors, topological insulators, *etc.*). We have taken many approaches to the synthesis, manipulation, and device design of these materials. In our attempts to better understand the role of doping Nb into the MoS_2 and WS_2 systems, we serendipitously realized the merits, which previously lay quiescent, of studying NbS_2 itself. A metallic dichalcogenide, NbS_2 exhibits both charge density wave and superconducting phase transitions below respective appropriate temperatures. Studying mono, bi, and tri-layer geometries have afforded us the opportunities to probe not only the details of quantum confinement effects in the NbS_2 system, but also how these effects percolate through and affect the various properties of other dichalcogenidal systems.

Brian Cooper
The Pennsylvania State University

Date submitted: 28 Jan 2013 Electronic form version 1.4