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Quantum Transport Properties of Modified Graphene Nanoribbons with Boron Nitride Domains at the Mesoscopic Scale ALEJANDRO LOPEZ-BEZANILLA, ORNL — Graphene nanoribons are seen as promising building blocks for engineering graphene based field effect transistor (GNR-FET) . The quest for fabricating efficient GNR-FETs requires a trade-off between a sufficiently wide energy gap and a reasonably large charge mobility. The solution might be the chemical codoping of one-atom thick layers of C with B and N atoms. These hybrid systems are attracting much attention as they can provide an efficient way to create new materials with complementary properties to those of graphene and h-BN. I will present a study of charge transport in graphene nanoribbons with BN domains randomly distributed along the ribbon surface. My results describe how the conductance of the hybrid systems is altered as a function of the incident electron energy and the BN domain density which leads to transport band gap opening. We explore the transport regimes comparing different degrees of BN codoping and BN domain size for ribbons of various widths and lengths on the order of the micrometer. A comparison with other types of defects such as oxygen atoms in epoxy configuration and functional groups covalently attached to the ribbon surface will be discussed as well.

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