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Quantum Conductance of Graphene Nanoribbons (GNRs) ZHE KAN, CHRIS NELSON, MAHFUZA KHATUN, Physics and Astronomy, Ball State University — We will present results of band structure, density of states (DOS), and the effects of defects on the conductance of graphene nanoribbons (GNRs). These nanoribbons can be either metallic or semiconducting depending on their edge structures. These are robust materials with excellent electrical conduction properties and have the potential for device applications. A tight-binding (TB) model has been used for the calculation of electronic band structure, and the Green's function method and the Landauer formula have been implemented for determining the transmission and conductance, respectively. We have investigated the effects of vacancy, weak disorder, and the presence of oxygen on conductance. The resulting local density of states (LDOS) and conductance bands show that electron transport has interesting behavior in the presence of any disorder. In general, the presence of any disorder in the GNRs causes a decrease in conductance. In the presence of a vacancy at the edge site, a maximum decrease in conductance has been observed which is due to the presence of quasi-localized states.

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