Abstract Submitted
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Photoemission from Graphene on Copper and Cesium Antimonide: Theory and Experiment[1] DANIEL FINKENSTADT, US Naval Academy, KEVIN L. JENSEN, SAMUEL G. LAMBRAKOS, US Naval Research Laboratory, ANDREW SHABAEV, George Mason University, NATHAN A. MOODY, Los Alamos National Laboratory — The work function is calculated using DFT for a substrate of flat copper on which a single layer of graphene is deposited. These calculations show a reduced work function, compared to bare copper, when graphene is deposited on a cathode. Based on our DFT-calculated results, a simple model using the transfer matrix approach gives the transmission probability near and above the barrier maximum. An important element of our model is the DFT-calculated, macroscopically-averaged electrostatic potential. Using this potential, graphene behaves as a resonant well for electrons transmitted between the substrate and vacuum regions. Another system to be discussed is graphene atop cesium antimonide, which has very low work function making it technologically useful, in particular for the development of an x-ray free electron laser. On cesium antimonide, we examine whether graphene may allow for the retention of an underlying cesium layer that is often damaged in high-field applications. A discussion of these results in light of recent experimental characterization at LANL will be given.

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