

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

An Einzel lens apparatus for deposition of levitated graphene on a substrate in UHV JOYCE COPPOCK, PAVEL NAGORNYKH, IAN MCADAMS, University of Maryland, College Park, BRUCE KANE, Laboratory for Physical Sciences, College Park, MD and Joint Quantum Institute, University of Maryland, College Park — The goal of our research is to levitate a charged micron-scale graphene flake in an electrical AC quadrupole trap in ultra-high vacuum (UHV) in order to study its properties and dynamics while decoupled from any substrate [1,2]. As a complement to the optical measurements that can be performed on the levitated flake, we are developing a method of depositing the same flake on a substrate, which can be removed from the system for further study using such probes as atomic force microscopy (AFM) and scanning tunneling microscopy (STM). As the flake is released from the trap and propelled toward the substrate, its trajectory will be controlled by an Einzel (electrostatic) lens to achieve accurate positioning on the substrate. This talk will discuss the design of the lens as well as particle tracing simulations to determine the proper lens voltage to focus the particle's trajectory. In the future, deposited graphene may be used to passivate H-terminated silicon. The method is expected to be generalizable to achieve deposition of 2D materials on surfaces in a clean UHV environment. [1] Kane, B.E. *Phys. Rev. B.*, **82**, 115441 (2010). [2] Nagornyykh, P., et. al. *Appl. Phys. Lett.* **106**, 244102 (2015).

Joyce Coppock
University of Maryland, College Park

Date submitted: 06 Nov 2015

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