Adelina Ilie, J Nanomed Nanotechnol 2014, 5:5
http://dx.doi.org/10.4172/2157-7439.S1.017

OMICS Group Conferences
Accelerating Scientific Discovery

4th International Conference on
Nanotek & Expo

December 01-03, 2014 DoubleTree by Hilton Hotel San Francisco Airport, USA

Wavefunction engineering in graphene systems

Adelina Ilie
University of Bath, UK

Electrons in graphene obey Dirac physics which manifests itself through unconventional quantum phenomena, e.g. Klein tunneling - where transmission normal to a potential barrier is close to unity. As a result, graphene systems present unique opportunities for engineering of the electron wave function. This would pave the way towards graphene devices and applications that are conceptually entirely new in condensed matter physics and nanoelectronics, such as lateral devices based on quantum interference, or configurable wiring and electron guides. In this presentation the author will focus on two routes for achieving such wave function tailoring: Through quantum interference phenomena at lateral interfaces and edges within multi-stacked graphene systems (providing different electron behavior at "hard" and "soft" edges, while interference patterns are controlled by the stacking sequence); and through controlling and modulating the surface potential of the graphene sheet at nanoscale/atomic level *via* interaction with the substrate and its nanostructures (naturally-occurring or bottom-up engineered). Experimental evidence is collected from scanning probe microscopy studies (Scanning Tunneling, non-contact Atomic Force and Kelvin Probe Microscopies), while theoretical support comes from both full *ab-initio* and semi-classical calculations. Further, the author will show that inorganic nanostructures provide routes for designing/controlling potentials, electronic superstructures and, ultimately, electron behavioral so in related systems, i.e., carbon nanotubes with encapsulated nanowires. Overall, these examples illustrate generic principles for nanoscale design of properties in graphene-based hybrid systems.

Biography

Adelina Ilie is an Associate Professor at the University of Bath, UK, working in the general field of nanotechnology. Her group's focus is on hybrid architectures of 2D or 1D systems, and on scanning probe (SPM) technologies for nano-probing and unconventional nanofabrication (having pioneered "nanostencilling"). She is also developing novel biomedical applications based on graphene. She is a founding member and co-investigator of the Bath-Exeter Centre for Graphene Science, UK. Prior to coming to Bath, she has been a Lecturer in Nanotechnology at the University ofCambridge, UK, and held Research Fellowships from Cambridge and NIMS/JSPS, Japan.

a.ilie@bath.ac.uk