

## **Announcing the Final Examination of MARTA ANGUERA ANTONANA for the Degree of Doctor of Philosophy in Physics**

**Date:** Tuesday, June 27, 2017

**Time:** 1:00 p.m.

**Room:** PSB 445

**Dissertation title:**

Spin and Charge Transport in Graphene Based Devices

**Abstract:**

The control and manipulation of spin and charge degrees of freedom in nanoscale systems has developed into a very active field of research during the last decade, triggered by possible applications in emerging technologies, such as spintronics and molecular electronics. Spintronics final goal is to actively manipulate the spin degree of freedom of electrons. In addition, it has the potential to provide smaller, non-volatile memory devices than standard CMOS. It has also been demonstrated that pure spin current devices offer advantages over spin and charge current devices, the main one being reduced power dissipation. The first part of the dissertation will be focused on studying a particular technique for obtaining pure spin currents: Dynamical spin injection.

On the other hand, molecular electronics is another very promising substitute to silicon nanoelectronics. The idea that single molecules could replace every electric component in a circuit represents a final miniaturization for devices. Molecules have already been functionalized to act as diodes, transistors and switches, to name a few. To advance in the field, the electronic properties of single-molecules must be studied and only few techniques allow the study of transmolecular conduction, scanning tunneling microscopy (STM) and single-electron transistors (SETs) spectroscopy are two of them. In the second part of my thesis, single-molecule transport on a molecular double quantum dot is demonstrated and the development of graphene-based transistors for SET and STM measurements are presented.

**Outline of Studies:**

Major: Physics

**Educational Career:**

M. S. University of Central Florida, USA, 2015

B. S. Universitat de Barcelona, Spain, 2011

**Committee in Charge:**

Dr. Enrique del Barco (Chair)

Dr. Aniket Bhattacharya

Dr. Robert E. Peale

Dr. Winston V. Schoenfeld (External Committee Member)

Approved for distribution by Dr. Enrique del Barco, Committee Chair, on June 13, 2017.

The public is welcome to attend.