JOHANNES KEPLER UNIVERSITÄT LINZ

PHYSIKKOLLOQUIUM
Fachbereich für Physik

Im Rahmen des Physikkolloquiums spricht

Dr.in Andrea Navarro Quezada

Institute of Semiconductor and Solid State Physics
Quantum Materials Group
JOHANNES KEPLER UNIVERSITY LINZ

über

Hybrid materials for spintronics: assembly and performance

Spintronics is a research field dedicated to the study of the fundamentals and applications of spins in mater. Spintronic devices take advantage of spin-polarized current injection, detection and manipulation. In order to overcome the limitations in high-speed and high-density in current devices, the urge for new materials for the development of ultra-fast, high performance, low current electronic devices, exists.

Magnetic semiconductors, which combine semiconducting properties, like a tunable band gap, with magnetic functionalities, are suitable candidates for achieving functional spin-dependent magneto-optical and magneto-electrical devices. Among the existing magnetic semiconductors, hybrid ferromagnetic/semiconductor materials containing ferromagnetic or antiferromagnetic nanostructures are expected to improve the performance of various existing commercial devices.

Here, I will present the work dedicated to the understanding of the fundamental properties of hybrid materials for spintronics, in particular ferromagnetic (semi)metals in combination with inorganic and organic semiconductors, from their fabrication to their overall performance. Two main topics will be addressed. The first is concerned with self-assembled magnetic $(Ga_y)Fe_{4-y}N$ ($0 < y < 1$) nanocrystal arrays embedded in GaN thin layers, where it is shown that their size, shape, density, crystalline structure, stoichiometry and, thus, the magnetic properties can be adjusted through the fabrication conditions. Moreover, the transport of spin-polarized currents below 10 K, as well as a strong shape-induced out-of-plane magnetic anisotropy, in this phase-separated magnetic nitride are demonstrated. The second topic deals with *in-situ* and real-time investigations of organic dyes on ferromagnetic Ni ultrathin films. Here, I will show the improvement of a magneto-optical Kerr effect spectroscopy setup to investigate the spin-interface between organic molecules and tuneable ferromagnetic surfaces as a function of layer thickness and temperature.

The understanding of the fundamental properties of these hybrid ferromagnetic/semiconductor systems is crucial for their implementation into spintronic devices.

Zoom-Meeting beitreten
https://jku.zoom.us/j/92525013654?pwd=TGZSREVkVTRhTE5VcjM4NjF2dHBGdz09

Meeting-ID: 925 2501 3654
Passwort: 642389

Datum: Mi, 16.12.2020 **Zeit: 15:30 Uhr** **Ort: ZOOM-Meeting**