Πανεπιστήμιο Κύπρου
Τμήμα Φυσικής

Το Τμήμα Φυσικής του Πανεπιστημίου Κύπρου
σας προσκαλεί την

Τρίτη, 17 Οκτωβρίου 2023, ώρα 10:00
στην αίθουσα Β228, στο κτίριο 13 στην Πανεπιστημιούπολη

στην παρουσίαση της Διδακτορικής Διατριβής του Κωνσταντίνου Νικολαΐδη

"UNRAVELING SPIN CURRENT CONTROL IN SOLUTION-PROCESSED-ORGANIC MATERIAL SYSTEMS"

This presentation deals with the investigation of the physics of spin current in solution-processed materials via the spin pumping method and consists of three independent studies. Initially I will describe some of the most important concepts of spintronics and then I will focus on the presentation of the three projects.

In order to shed light on the puzzling topic of the spin transport properties in conducting polymers, we report a systematic study of spin transport in PEDOT:PSS, a typical solution-processed organic material, at different chemically defined doping levels. The key parameters governing the spin properties of PEDOT:PSS are estimated separately and reveal that the variation of the spin properties at different doping level can be attributed to the change of the spin orbit coupling strength, induced by alteration of the structural conformation in the polymer. The result has wider applicability in other polymer material systems.

Moreover, we investigate the possibility of a solution-processed organic radical operating as a spin emitter to replace common metal ferromagnets in spintronic devices. We report the fabrication of a stable Blatter-type radical/Permalloy bilayer and carry out simultaneous electron-spin and ferromagnetic resonance measurements. A signature of spin current emission from the radical is obtained through its increased linewidth. This increase is vanished when carefully tuning the two resonances to coincide, demonstrating that the radical linewidth increase can be reversibly reduced due to emission of a backward spin current from the ferromagnetic layer, effectively cancelling the radical's emission.

Finally, we deal with the influence on the spin pumping process of the morphology of a ferromagnetic film grown onto a solution-processed organic-inorganic hybrid perovskite film. A series of $CH_3NH_3PbI_{3-x}Cl_x$/NiFe heterostructures is prepared at various NiFe thicknesses and we observe an evolution of the morphology from island growth to a continuous thin film. This evolution seems to affect the ability of spin transfer to the $CH_3NH_3PbI_{3-x}Cl_x$ layer observed as a sharp increase of the spin mixing conductance of the interface. Our results have wider implications for the efficiency of spin current injection in perovskites and generally in solution-processed films.

Η παρουσίαση θα είναι ανοικτή στο κοινό μέσω τηλεδιάσκεψης:
https://ucy.zoom.us/j/62896144563?pwd=TnYzcGJGdHVFQ3plZXI5a3V5ZnBKdz09

Για περισσότερες πληροφορίες παρακαλώ επικοινωνείτε: Τμήμα Φυσικής, τηλέφωνο: 22892820