

PANAGIOTIS RODOSTHENOUS

ONISILOS MSCA COFUND FELLOW



Πανεπιστήμιο Κύπρου
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ONISILOS



This project aims to develop novel RoHS (Restriction of Hazardous Substances Directive) -compliant doped InAs colloidal quantum dots (QDs) and their integration into functional optoelectronic devices operating in near-infrared (NIR). The synthesis, surface passivation, and electronic functionalization of such NCs will be probed, with a view to producing nanomaterials suitable for niche optoelectronic applications in the NIR.

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Moving beyond the state-of-the-art, this project aims to exploit recent advances in the colloidal synthesis of InAs NCs, allowing the fabrication of robust QDs with improved optoelectronic properties and enhanced stability. The aim of the work is to further functionalize such QDs and render them suitable for optoelectronics by investigating the Al-doping in Field-Effect Transistor (FET) device. This project will provide new insights into the effect of Al-doping in colloidal InAs NCs, such as modifying the bandgap and electrical conductivity. The fellow will combine his advanced NC modeling skills with optimized colloidal synthesis, and advanced solid-state spectroscopy measurements to thoroughly characterize the unexplored Al-doped InAs NCs.

The proposed project will provide new insights into the effect of Al-doping in colloidal InAs NCs, identifying potential applications of new generation, toxic-metal-free NCs for optoelectronic applications in the IR/NIR region. Following the described methodology, the fellow will combine his advanced NC modeling skills with optimized colloidal synthesis, and advanced solidstate spectroscopy measurements to thoroughly characterize the unexplored Al-doped InAs NCs.

The fellow will join the teams in the UCY (Physics and Chemistry groups), being exposed and trained to advanced optical and structural characterization techniques, as well as colloidal synthesis. The experimental groups of Dr. G. Itskos and Dr. S. Christodoulou are of high level, with expertise in colloidal synthesis and experimental characterization of nanomaterials.