



# Metamaterial Plasmonic Tweezers for Trapping Quantum Dots

## Seminar

Monday 27.03.2023 10:30

Lecture Room 2.6

Glass building 2<sup>nd</sup> floor



**Theodoros Bouloumis,**

PhD Researcher,

Light-Matter Interactions for Quantum Technologies unit

Okinawa Institute of Science and Technology

Japan

**Abstract:** The technique of optical tweezers has evolved into a powerful tool for trapping and manipulating a variety of particles from quantum dots to proteins. However, heating of the trapped specimens is a fundamental limitation of the optical tweezers that results in the destruction of the specimens[1]. Plasmonic structures were implemented to overcome this problem, which make use of evanescent near-fields able to trap particles with a size of 10 nm with very low laser intensities, thus avoiding heating effects[2]. In this talk, I will present a type of plasmonic optical tweezers based on metamaterial structures[3], that provides superior trapping efficiency for trapping novel, biocompatible quantum dots. Their advantages and disadvantages will be discussed along with the simulations and fabrication methods. Experimental details of the techniques will be provided with their respective challenges. Lastly, I will discuss potential applications in the quantum technologies field and the realization of quantum computers.

[1] *Applied Sciences*, 10, 4, 1375 (2020) [2] *Nanotechnology*, 32, 025507 (2020) [3] *Optics (physics.optics)*, arXiv:2211.08613, (2022)

 Στο τέλος του σεμιναρίου θα γίνει μια σύντομη περιγραφή του OIST (Okinawa Institute of Science and Technology) και των προγραμμάτων διδακτορικών σπουδών.

**ZOOM live-streaming <https://authgr.zoom.us/j/93328530744>**