ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ
ΤΜΗΜΑ ΕΠΙΣΤΗΜΗΣ ΚΑΙ ΤΕΧΝΟΛΟΓΙΑΣ ΥΛΙΚΩΝ

Πρόσκληση σε Δημόσια Παρουσίαση της Διδακτορικής Διατριβής του

κ. Εμμανουήλ Αμαργιανιτάκη

με θέμα:

«Πολαριτονικά Λέιζερ Νιτριδίων»

(Σύμφωνα με το άρθρο 41 του Ν. 4485/2017)

Τετάρτη 16 Δεκεμβρίου 2020 και ώρα **14:00**

https://teleconf.materials.uoc.gr/b/sta-5id-wch-g3o

Η παρουσίαση θα διεξαχθεί με τηλεδιάσκεψη στον παραπάνω σύνδεσμο, σύμφωνα με το άρθρο τρίτο, παρ. 1 της με αριθμ. 115744/Ζ1/4.9.2020 Κοινής Υπουργικής Απόφασης (Β΄3707).

Abstract

The main aim of this doctoral thesis involved the study of exciton-photon polaritons in novel polar (c-) and non-polar (m-) III/V microcavities. In particular, the goal was to improve further the previous all-dielectric planar microcavity devices by fabricating GaN-based sub-wavelength films with low roughness, using the photo-electrochemical etching technique based on the selective removal of a sacrificial InGaN layer. The epitaxial growth was performed by plasma-assisted molecular beam epitaxy on c-GaN/Sapphire templates for the polar-oriented structures and on m-plane GaN substrates for the non-polar ones. After the membrane separation, an important step was the transfer of the 200-nm-thick GaN-based membranes on Sapphire which allowed us to accurately measure the absorption coefficient, based on μ-transmittance measurements and taking into account the standing wave effects. To produce complete microcavities, QW-containing membranes were embedded in between top and bottom distributed Bragg reflectors (DBRs) formed by evaporating alternating pairs of SiO_2 and Ta_2O_5 oxides, illustrating a high refractive-index contrast, and hence, providing increased photon confinement with a reduced number of total pairs. The state-of-the-art fabrication allowed for the observation of well-resolved polariton branches in the k –space imaging with the characteristic anti-crossing behavior and remarkable polariton lasing at RT with record-low power thresholds, using merely a 4-pair top DBR. Finally, a new concept in the development of microcavities is demonstrated, where “transferrable” oxide-based DBR membranes (*t*-DBRs) are used for the first time as top microcavity mirrors.