

**ΠΡΟΣ**

- 1) Όλα τα μέλη ΔΕΠ του Τμήματος Επιστήμης και Τεχνολογίας Υλικών
- 2) Τους εκπροσώπους των Μεταπτυχιακών φοιτητών του Τ.Ε.ΤΥ
- 3) Την Επταμελή Εξεταστική Επιτροπή
- 4) Όλα τα μέλη της Πανεπιστημιακής Κοινότητας

Πρόσκληση σε Δημόσια Παρουσίαση της Διδακτορικής Διατριβής του

κ. Γερμάνη Σάββα

(Σύμφωνα με το άρθρο 12 του Ν. 2083/92)

Την Δευτέρα 26 Οκτωβρίου 2015 και ώρα 11:00 π.μ.

στην αίθουσα σεμιναρίων 3^{ου} ορόφου στο κτίριο του Τμήματος Φυσικής

θα γίνει η δημόσια παρουσίαση και υποστήριξη της Διδακτορικής Διατριβής του υποψήφιου διδάκτορα του Τμήματος Επιστήμης και Τεχνολογίας Υλικών

κ. Γερμάνη Σάββα με θέμα:

«Φωτονικές Διατάξεις Πιεζοηλεκτρικών Κβαντικών Τελειών »

«Photonic Devices of Piezoelectric Quantum Dots»

ABSTRACT

Semiconductor Quantum Dots (QDs) are an ideal artificial system to study fundamental properties of matter and the ultimate component of quantum information processing. Towards the implementation of a tunable source of single photons or entangled photon pairs, we present here a study on self-assembled InAs/GaAs QDs, grown on a high-index (211)B GaAs substrate. The system has all the benefits of regular and well-studied (100) InAs/GaAs QDs, but additionally has a fascinating characteristic, which is the presence of a large vertical piezoelectric (PZ) field inside the QDs, bringing in a number of significant advantages, which are illustrated in this work. First, the PZ field along the growth direction preserves the high symmetry of the confining potential, leading to negligible fine structure splitting (FSS) values in the system, which is essential for entanglement applications. By polarization resolved micro-photoluminescence experiments we deduce negligible FSS values of PZ QDs, which make them good candidates for quantum information applications. Second, the PZ field generates large exciton–biexciton energy splittings, which is prerequisite for single photon applications at high temperatures. This ability is demonstrated by cross-correlation experiments on single exciton emission lines, showing clear anti-bunching behaviour at elevated temperatures. Third, due to the pronounced PZ field, the emission wavelength of these QDs should be very sensitive to an applied external electric field, leading to significant Stark shifts in this QD system. To explore this, a special dot-containing diode structure has been fabricated and studied, and enhanced Stark tuning of the QD emission has been observed. Finally, our results provide a clear demonstration of the importance of non-linear piezoelectric effects in Zinc-Blende semiconductors.