

ΣΕΜΙΝΑΡΙΟ ΚΕΝΤΡΟΥ ΚΒΑΝΤΙΚΗΣ ΠΟΛΥΠΛΟΚΟΤΗΤΑΣ &  
ΝΑΝΟΤΕΧΝΟΛΟΓΙΑΣ/ CCQCN SEMINAR

**Tuesday, 01 December 2015**

**11:00-12:00**

**3<sup>rd</sup> Floor Seminar Room**

***Photonic Crystals and Metamaterials with gain***

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**Abstract**

In this talk we examine Photonic Crystals and Metamaterials coupled with a gain material. Incorporation of gain in these systems can be utilized for different purposes; in photonic crystals, lasers with low lasing thresholds can be designed and in metamaterials loss compensation of the resonators can be achieved. In particular, here we examine how the lasing threshold of a two dimensional photonic crystal containing a four-level gain medium is modified, as a result of the interplay between the group velocity and the modal reflectivity at the interface between the cavity and the exterior. Using a four-level gain system, we also study light amplification of arrays of metallic split-ring resonators with a gain layer underneath. The simulations, which demonstrate reduction of the resonator damping, agree with pump-probe experiments and can help to design new experiments to compensate for the losses of metamaterials.

