



Ph.D. Course in Materials Science and Nanotechnology

University of Milano-Bicocca, Department of Materials Science, via Cozzi 55, 20125 Milano

April 16, 2019 – 3.00 p.m.

Seminar room - Department of Materials Science U5

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What Limits the Efficiency of Green (0001) InGaN LEDs?

The external quantum efficiency (EQE) of InGaN based LEDs reduces strongly from blue to the green spectral range. The main origin of this "green gap" is thought to be the reduced overlap of the electron and hole wave function due to the increased piezo-electric fields.

Our analysis of experimental EQE curves and carrier lifetimes suggests that non-radiative recombination is an important factor to the green gap. For semi-polar QWs the holes are badly confined, which allows for easy laser operation but bad LED performance, since the hole are likely to recombine at defects in the upper barrier.

Hence, the performance of green LEDs cannot be improved to match that of blue LEDs only by reducing the piezoelectric fields. Point defects and other sources of non-radiative recombination must also be addressed, either by applying appropriate semi-polar orientations or via Al containing interlayers.

PhD students and all interested in the seminar are kindly invited to participate.