

Scuola di Dottorato in ICT

Doctoral School in ICT

Research project for a PhD curriculum in ICT – Computer Engineering and Science/Electronics and Telecommunications

Tutor: Prof. Alessandro Chini

Proposed Title of the research:

Characterization and numerical simulations of GaN HEMTs for microwave and millimeter-wave power applications

Keywords:

Compound Semiconductors, GaAs, GaN, HEMT, Power Devices

Research objectives:

Numerically analyze and experimentally characterize Gallium Arsenide (GaAs) and Gallium Nitride (GaN) High Electron Mobility Transistors (HEMTs) that are commercially available or that will be fabricated during the PhD course thanks to the connections with other research groups.

The research will focus on the study of the device performances that are currently limited by material quality and processing techniques. The research goal will be to optimize both the epitaxial structure and processing steps in order to improve the device performances for high frequency and high power applications.

Proposed research activity:

Numerical simulation of GaAs and/or GaN HEMTs. Experimental characterization of GaAs and/or GaN HEMTs. Evaluation of the reliability of GaAs and GaN HEMTs by means of DC and RF stress tests. Interpretation of degradation mechanisms by means of numerical simulation.

Supporting research projects (and Department)

FIRB 2007-2010 (Dipartimento di Ingegneria dell'Informazione)

PRIN 2008-2009 (Dipartimento di Ingegneria dell'Informazione)

Possible connections with research groups, companies, universities..

University of Padova, Italy

National Nanotechnology Lab (NNL), Lecce, Italy

University of California, Santa Barbara, USA

SELEX Sistemi Integrati, Rome, Italy