Technology Opportunity

The CUNY Center for Advanced Technology In Photonics Applications (CUNY CAT)
Designated by NYSTAR, the New York State Foundation for Science, Technology and Innovation

Photoreflectance / Contactless Electroreflectance Spectroscopy for Semiconductor Evaluation

Non-destructive, room temperature characterization for wafer-scale semiconductor thin films and devices

Photoreflectance (PR) contactless electroreflectance (CER) spectroscopy is a practical, cost effective method for characterizing semiconductor thin films and real device structures. With unprecedented versatility PR/CER can be used in the development, evaluation, and quality control of a wide variety of advanced III-V and II-VI semiconductor materials, including the group III-Nitrides.

PR/CER is currently in use by several companies for production-line quality control: TRW, Texas Instruments, NORTEL Technologies, and Kopin.

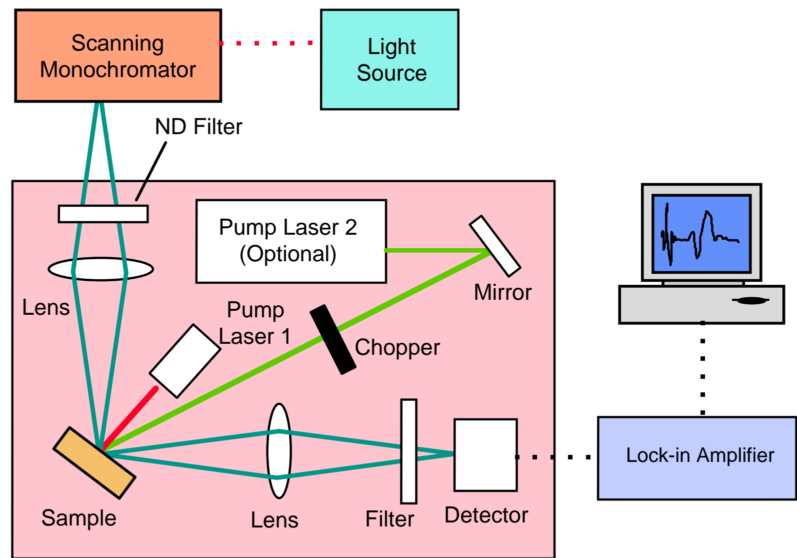
Recently, a new system has been developed which makes possible measurements of photoluminescence and PR/CER without the need to change either sample or optical configurations.

Applications:

- Electromodulators
- Quantum well lasers
- Heterojunction bipolar transistors
- Pseudomorphic high electron mobility transistors

Information obtainable:

- Band structure
- Material quality
- Alloy composition
- Surface/interface electric fields
- 2-D electron gas density
- Quantum well characteristics
- Process- or growth-induced strain and/or damage
- Micro-PR option with spatial resolution of 10 μm



Schematic of PR/CER system

This technology opportunity sheet describes continuing efforts in this area. Several patents may have been issued or are pending and which may be available for licensing.

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