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14. ABSTRACT

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RPPR Final Report
as of 29-Oct-2018

Agency Code:

Proposal Number: 68466ELRIP

Agreement Number: W911NF-16-1-0332

INVESTIGATOR(S):

Name: Ph.D Gary Wicks Ph.D.
Email: wicks@optics.rochester.edu
Phone Number: 5852754867
Principal: Y

Organization: **University of Rochester**

Address: ORPA, Rochester, NY 146270140

Country: USA

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Final Report for Period Beginning 15-Jul-2016 and Ending 14-Jul-2017

Title: Equipment for Research and Education in III-V Semiconductor Crystal Growth and Device Characterization

Begin Performance Period: 15-Jul-2016

End Performance Period: 14-Jul-2017

Report Term: 0-Other

Submitted By: Ph.D Gary Wicks

Email: wicks@optics.rochester.edu

Phone: (585) 275-4867

Distribution Statement: 1-Approved for public release; distribution is unlimited.

STEM Degrees: 0

STEM Participants: 4

Major Goals: The Goal of this DURIP program is design, purchase, and installation of equipment in support of research and education in III-V device physics and materials. The main infrastructures to be addressed are molecular beam epitaxy and electro-optic measurements of III-V devices.

Accomplishments: Equipment designed, purchased, and installed in this program support our ARO research program on III-V semiconductor device physics and materials. The program's equipment was in two general areas: molecular beam epitaxy (MBE) and electro-optic device measurements. The MBE equipment was part of repair and upgrade of our present Riber 32P MBE machine. The MBE machine is 30 years old, so some of the equipment in the program was replacements of old and failing components such as effusion cell power supplies. Other MBE equipment was an upgrade in capabilities, mainly a home made infrared sensing system to enable in situ substrate temperature and epitaxial layer growth rate. The electro-optic test equipment is add-on to our existing infrared spectroscopy and device measurement system. The spectroscopy system is upgraded to enable modulation of a photoluminescence set up to enable subtraction of background infrared. The device measurement system had been purely electrical measurements vs. temperature of test devices. With this program, optical capabilities were added to the system so that photoresponse can be measured vs. temperature.

Training Opportunities: Three PhD students participated in the program, under the supervision of the PI. The students activities included design and installation of the equipments, and its use in research.

Results Dissemination: Two conference presentations and three journal articles resulted from this program.

Honors and Awards: Nothing to Report

Protocol Activity Status:

Technology Transfer: Nothing to Report

PARTICIPANTS:

Participant Type: PD/PI

Participant: Gary W Wicks

Person Months Worked: 12.00

Project Contribution:

Funding Support:

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International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Participant Type: Graduate Student (research assistant)

Participant: Brendan Marozas

Person Months Worked: 12.00

Funding Support:

Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Participant Type: Graduate Student (research assistant)

Participant: William Hughes

Person Months Worked: 12.00

Funding Support:

Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Participant Type: Graduate Student (research assistant)

Participant: Xiaoyu Du

Person Months Worked: 6.00

Funding Support:

Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Nothing to report in the uploaded pdf (see accomplishments)