Title of Proposed Project:

**II-VI Semiconductor Based Dual-Band Multi-Color Quantum-Well Infrared Photodetectors and Focal Plane Arrays**

Brief Abstract

The PI proposes to develop and fabricate multi-color QWIPs and FPAs using selenide-based wide band gap II-VI semiconductors. The material can be grown lattice-matched on InP, with a very large tunable conduction band offset, which make it possible to fabricate QWIP devices covering all the spectral regions of SWIR, MWIR, LWIR, and VLWIR. Since the devices that detect light in different wavelength ranges can all be grown lattice-matched to the InP substrates, a large number of QW repeats can be grown for each individual one-color detector, which ensures the high absorption quantum efficiency in the overall multi-color QWIP device. With the increase of QW repeats, the dark current noise may be significantly reduced and the dark current-noise limited detectivity can be considerably increased. Compared to their III-V counterparts, the wide band gap II-VI semiconductors also have the advantage in suppressing carrier leakage due to intervalley electron scattering.

Relevant Publications & Scholarship


Yu Yao, Adrian Alfaro-Martinez, Kale J. Franz, William O. Charles, Aidong Shen, Maria C.


Qiang Zhang, Yunpu Li, Xuejun Liu, Daniela Pagliero, Aidong Shen, Carlos A. Meriles and Maria C. Tamargo, “Dependence of electron spin relaxation times on the crystal orientation of CdTe grown on (100)ZnSe/GaAs substrates”, Phys. Stat. Sol. (c) 7, 1665 (2010).


Qiang Zhang, Yunpu Li, Daniela Pagliero, William Charles, Aidong Shen, Carlos A. Meriles, Maria C. Tamargo, “Controlled growth of (100) and (111) CdTe epitaxial layers on (100) GaAs by molecular beam epitaxy and study of their electron spin relaxation times”, J. Vac. Sci. Technol. B 28, C3D1 (2010).


Education

<table>
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<tr>
<th>Institution</th>
<th>Degree</th>
<th>Year(s)</th>
<th>Discipline</th>
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<td>Xiamen University</td>
<td>B. S.</td>
<td>1987</td>
<td>Physics</td>
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<td>Chinese Academy of Science</td>
<td>Ph. D.</td>
<td>1992</td>
<td>Applied Physics</td>
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Other Current & Past Funding (last 5 years)

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<td>$40,000.00</td>
<td>Physical Optical Corporation</td>
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<td>MBE Growth and Characterization of ZnO-based semiconductors for Intersubband Devices</td>
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### Grants

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<td>MRI: Acquisition of a High Resolution X-Ray Diffraction System for Materials Research at CCNY</td>
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### Attachments

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### Budgets

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<td>MTA Payroll Tax</td>
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<td>This will be used to cover some general office supplies that are essential for performing the proposed research.</td>
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<td>This will partially cover the materials and supplies for the proposed research.</td>
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<td>This is to pay partially a PhD student's stipend. The student will work on the proposed project.</td>
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