Department of Electrical and Computer Engineering

IMR Institute For Materials Research

The Ohio State University Discovery Themes

Antimonide Based Infrared Detector Capability for NASA Missions

KIND Krishna INfrared Detector Laboratory

The Ohio State University

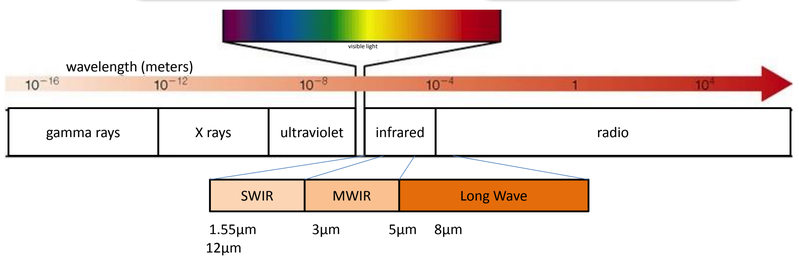
Sanjay Krishna, George R Smith Chair and Professor of Electrical and Computer Engineering Department

Research Lab Thrusts

Antimonide Based Infrared Materials and Devices

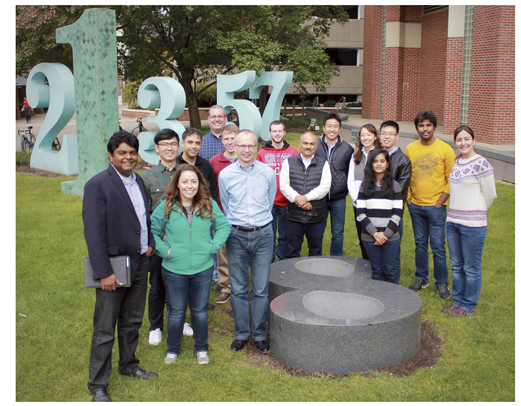
Next Generation Focal Plane Arrays

Novel Applications of Infrared Imaging



We develop next generation infrared sensors and imagers using nanoscale materials and device architectures

KIND Lab Research Team



Senior Researchers

Dr. Chris Ball (Res. Sci.)
Dr. TJ Ronningen (Res. Sci.)
Dr. Zahra Taghipour (Postdoc)
Dr. Nicole Pfiester (Postdoc)
Sen Mathews (Res. Eng.)
Prof. Ha Sul Kim (Vis. Sci.)
Dr. Sang Woo Kang (Vis. Sci.)
Dr. Yun Hee Chang (Vis. Sci.)

Students

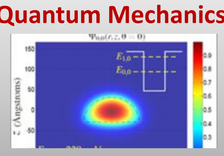
Teressa Specht (Ph.D.)
Vinita Dahiya (Ph.D.)
Seunghyun Lee (Ph.D.)
Sri Harsha Kodati (Ph.D.)
Rudy Fink (M.S.)
Brett Ringel (M.S.)
Jeffrey Simon (Undergrad)

Website: kind.engineering.osu.edu

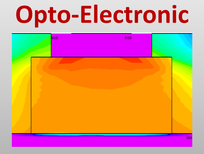
Design to Imaging Capability

Design Using Simulations and Models

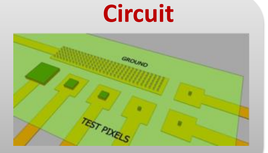
Quantum Mechanics



Opto-Electronic



Circuit



Growth of Semiconductor Materials

Molecular Beam Epitaxy

Super-lattice

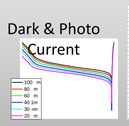
Chemical Vapor Deposition

Fabricate, Package, and Test Devices

Integrated Optics

Focal Plane Array

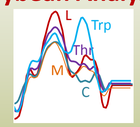
Characterize



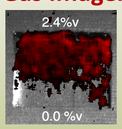
Test Systems and Applications

Thermal Imager

Soybean Analyzer

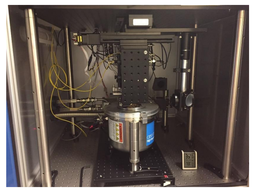


Gas Imager

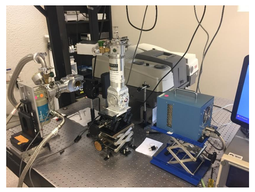


Three New Laboratories

AMBER
Antimonide Molecular Beam Epitaxy Reactor



OASIS
Optical Analysis and Screening of Infrared Semiconductors

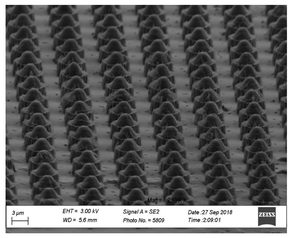


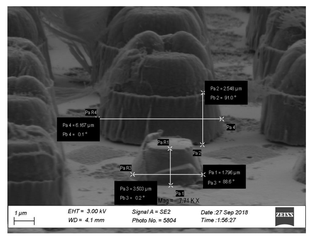
MICA
Mid-infrared Imaging, Characterization, and Application

These laboratories are available for internal and external users as a part of OSU user-facilities

Representative Projects

Antenna Coupled Infrared Detectors



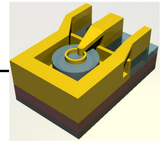


Superlattice Based Avalanche Photodiodes

ABLE

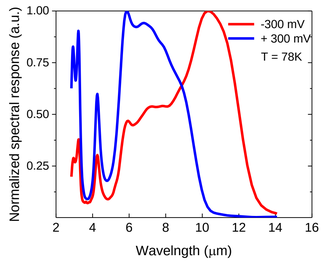
1.55 µm Illuminator
Wavefront Sensor
Feedback to adaptive optics
Fire control

LEAPS IR Detector

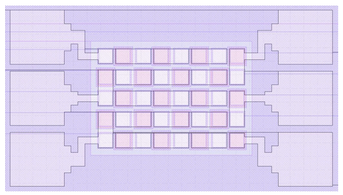


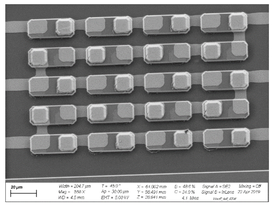
- Room temperature
- Rapid response
- High detectivity

Voltage Tunable Sensors

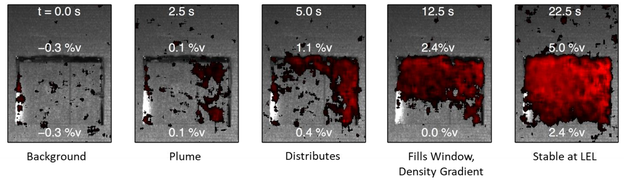


High Operating Temperature Detectors





Real-Time Imaging of Methane Plume



Collaborators

University

NC STATE UNIVERSITY
NM STATE
UIC UNIVERSITY OF ILLINOIS AT CHICAGO
UNIVERSITY OF MICHIGAN
Tufts UNIVERSITY
THE OHIO STATE UNIVERSITY
THE UNIVERSITY OF NEW MEXICO
UNIVERSITY of VIRGINIA

Industry

IQE
L3
SK Infrared
IntelliEPI

Government

KRISS Korea Research Institute of Standards and Science
MIT Lincoln Laboratory
NASA