

## III-V Semiconductor Unipolar Barrier Infrared Detectors



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### LECTURE ABSTRACT

The past decade has seen accelerated progress in III-V semiconductor infrared photodetector technology. The advent of the unipolar barrier infrared detector device architecture has in many instances greatly alleviated generation-recombination (G-R) and surface-leakage dark current issues that had been problematic for many III-V photodiodes. Meanwhile advances in a variety type-II superlattices (T2SLs) such as InGaAs/GaAsSb, InAs/GaSb, and InAs/InAsSb, as well as in bulk III-V material such as InGaAsSb and metamorphic InAsSb, have provided continuously adjustable cutoff wavelength coverage from the short wavelength infrared (SWIR) to the very long wavelength infrared (VLWIR). The confluence of these developments has led to a new generation of versatile, cost-effective, high-performance infrared detectors and focal plane arrays based on robust III-V semiconductors, providing a viable alternative to HgCdTe (MCT).

### SPEAKER BIOSKETCH

David Z. Ting received the B.S. degree (Hons.) in physics from the California Institute of Technology, Pasadena, in 1980, and the M.S. and Ph.D. degrees in physics from the University of Illinois at Urbana-Champaign in 1981 and 1986, respectively. He was a Senior Research Fellow in the Department of Applied Physics, Caltech, before joining the National Tsing Hua University, Hsinchu, Taiwan, as an Associate Professor of Physics in 1995. In 1998 he joined the NASA Jet Propulsion Laboratory, Caltech, Pasadena, where he is a Senior Research Scientist, Principal Member of Engineering Staff, and Deputy Director of the Center for Infrared Photodetectors. His research activities include the studies of electronic and optical properties of semiconductors, quantum transport in tunnel devices and nanostructures, spintronics, and infrared photodetectors. Results of his work have been reported in over 250 research publications and in over 160 conference presentations and technical seminars. He holds 17 patents. He received the NASA Exceptional Technology Achievement Medal in 2014 for contribution and leadership in the invention and implementation of advanced infrared detector technology for space and terrestrial applications. Dr. Ting is a senior member of the IEEE, and a Fellow of the SPIE.

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