



SPECIAL OSE SEMINAR SERIES

Dr. Rui Q. Yang

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Thursday, May 12, 2016 at CHTM, Room 103 from 11:00 AM to Noon

Quantum Engineered Interband Cascade Structures for Optoelectronic Devices

Abstract:

Interband cascade (IC) structures were originally introduced for achieving efficient mid-infrared (IR) lasers [1]. By taking advantage of the broken band-gap alignment in type-II InAs/Ga(In)Sb quantum wells to form interband cascade stages, significant progress has been achieved in the development of high-performance IC lasers with low power consumption [2-3], including successful operation of an IC lasers in Curiosity Rover on Mars and commercial availability. Recently, quantum engineered IC structures have been explored for other optoelectronic devices such as infrared photodetectors and photovoltaic cells with certain advantages [4-7]. Combination of interband transition and fast carrier transport in quantum engineered IC structure provides more flexibilities and advantages to achieve high device performance for photodetectors at high temperatures. The unique features and status of these IC structures and relevant optoelectronic devices will be reviewed and discussed with recent experimental results in IC infrared photodetectors (ICIPs).

Biography:

Dr. Yang received the B.Sc. degree in physics from Zhejiang University in 1982, and the M.Sc. and Ph.D. degrees in physics from Nanjing University in 1984 and 1987, respectively. He is the inventor of interband cascade (IC) lasers with research activities ranging from condensed matter physics to semiconductor quantum devices. Prior to joining OU as a professor in 2007, he was a Principal Member of Engineering Staff and a Task Manager at the Jet Propulsion Laboratory (JPL) in California, where he led the development of advanced mid-IR IC lasers for applications in Earth sciences and planetary explorations. He received the Edward Stone Award in 2007 from JPL for outstanding research publication and the successful accelerated infusion of cutting-edge interband cascade semiconductor laser technology into flight mission readiness. He is a fellow of both OSA and IEEE.

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