FORSCHUNGSVEREIN
des Instituts für Mikroelektronik Stuttgart e.V

Sehr geehrte Forschungsvereinsmitglieder,

hiermit möchte wir Sie herzlich einladen zu einem Vortrag von Prof. Kei May Lau, Hong Kong University of Science and Technology, betitelt

"III-V (III-nitride included) Electronic and Photonic Devices on Silicon"

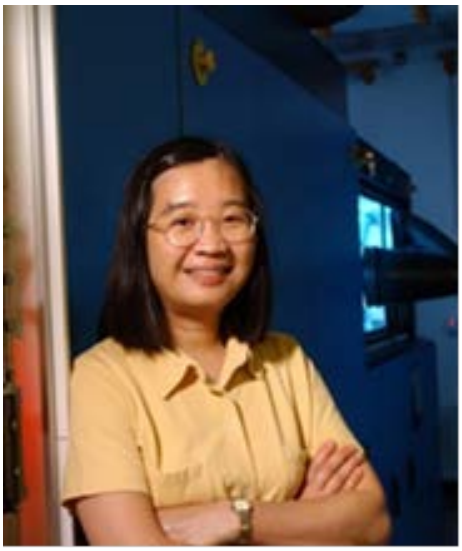
Die Veranstaltung findet am Freitag, 28/07/2017 von 11:00 bis 12:00 am IMS CHIPS in Stuttgart statt. Das Abstract des Vortrags sowie das Profil von Prof. Lau finden Sie unten.
Es würde uns sehr freuen, Sie beim Vortrag zu treffen.

Abstract:

III-Nitride devices are emerging as one of the most promising candidates for high efficiency power switching with high frequency and high voltage capabilities. We have developed advanced gate stacks and passivation techniques to achieve stable device operation with minimal threshold voltage (V_{th}) shift and low current collapse in GaN HEMTs and metal-insulator-semiconductor HEMTs (MISHEMTs). Power MISHEMTs with a 20-mm gate width and larger than 600V drain breakdown have been demonstrated using the high-k gate dielectric, exhibiting excellent switching characteristics. An enhancement-mode device with ultrathin-barrier AlGaN/GaN heterostructure and selective area barrier regrowth will also be discussed.

To support an energy-efficient optical interconnect technology enabled by silicon photonics, development of low-power-consumption active devices and associated integration technologies is needed. Quantum dot (QD) active layers grown on lattice-matched III-V substrates have demonstrated their benefits for lasers with low-thresholds and temperature-independent operation. In addition, the reduced sensitivity of QD to defects and their unique capability of filtering dislocations make them an ideal candidate as the gain medium of hetero-integrated III-V on Si optical sources. In this talk, I will discuss the growth of multi-stack QDs on compliant III-V/Si substrates by MOCVD. Fabrication and laser characteristics of whispering-gallery-mode (WGM) micro-lasers using the grown epitaxial structures will also be discussed. Initial demonstration was achieved using simple a colloidal lithography process in combination with dry and wet-etching. The micro-disk lasers were one to four microns in diameter, with single mode lasing at either 1.3 or 1.55 μm, depending on the barrier/cladding system. With smooth sidewalls and sufficient undercut by wet etching of the pedestal, the air-cladded MDs exhibit ultra-low thresholds of a few μW by optical pumping. Preliminary results of electrically-pumped micro-lasers will also be presented. These energy-efficient micro-lasers are excellent candidates for on-chip integration with silicon photonics.

Bio:



Professor Kei May Lau is Fang Professor of Engineering at the Hong Kong University of Science and Technology (HKUST). She received the B.S. and M.S. degrees in physics from the University of Minnesota, Minneapolis, and the Ph.D. degree in Electrical Engineering from Rice University, Houston, Texas. She was on the ECE faculty at the University of Massachusetts/Amherst and initiated MOCVD, compound semiconductor materials and devices programs. Since the fall of 2000, she has been with the ECE Department at HKUST. She established the Photonics Technology Center for R&D effort in III-V materials, optoelectronic, high power, and high-speed devices. Professor Lau is a Fellow of the IEEE (2001), a recipient of the US National Science Foundation (NSF) Faculty Awards for Women (FAW) Scientists and Engineers (1991), Croucher Senior Research Fellowship (2008), and the IEEE Photonics Society Aron Kressel Award (2017). She is an Editor of the IEEE EDL and Associate Editor of Applied Physics Letters.

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