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MSEC Seminar and Commercialization Forum

Invited Speaker:

Dr. Swaminathan Venkatesan

"Photonics Based Pressure Measurement Standard"

February 15th, 2019
1:30 – 3:00 PM
RFM 3241

Biography:
Dr. Swami Venkatesan received his Bachelor's degree in Metallurgical and Materials Engineering from the National Institute of Technology, India in 2006. He then completed his doctoral degree in electrical engineering at South Dakota State University. His doctoral dissertation was on the nanostructure-electronic property relationship in semiconducting polymers aimed towards low cost photovoltaic devices. He then worked as a post-doctoral researcher at the University of Houston and Texas State University, where he studied the phase transition and charge transport in inorganic-organic hybrid perovskite optoelectronic devices. He currently works at MKS Instruments Inc. as an R&D engineer in the Pressure and Vacuum Measurement Solutions business unit. His work involves development of novel pressure sensors and transducers based on MEMS and photonic technologies.

Abstract:
Highly accurate, traceable measurements of pressure and vacuum conditions are vital in many processes such as semiconductor manufacturing, oil and gas production and airline air-traffic control. Standard realizations such as the international system of units (SI) for pressure and vacuum are traditionally based on mercury manometers that precisely measure the column height differences as units of pressure. Such artifactbased metrological methods are being phased out in favor of quantum-based methods. Furthermore, bulky and expensive mercury is a neurotoxin and poses a risk to human health, thus warranting safe, more robust and reliable measurement methods. In pursuit

For more information or if you would like to have lunch with the speaker, please contact Dr. Shannon Weigum at sweigum@txstate.edu

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of the transition to quantum-based methods for the primary pressure measurement standard, the National Institute of Standards and Technology (NIST) has developed a novel photonic pressure-sensing device that has outperformed mercury manometers in speed, resolution and full scale range. This photonic device consists of two fixed length optical cavities (FLOCs) coupled with lasers to measure the change in the speed of light in a gas medium compared to that in a vacuum. The working principle of the FLOC and its superior performance compared to the traditional mercury manometer will be presented and discussed. Additionally, in an effort to develop this technique into a commercial product, MKS and NIST have collaborated on the development of a compact and portable FLOC based pressure measurement system. Details of the MKSNIST collaborative effort and preliminary results of the mini-FLOC system will be presented.

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