

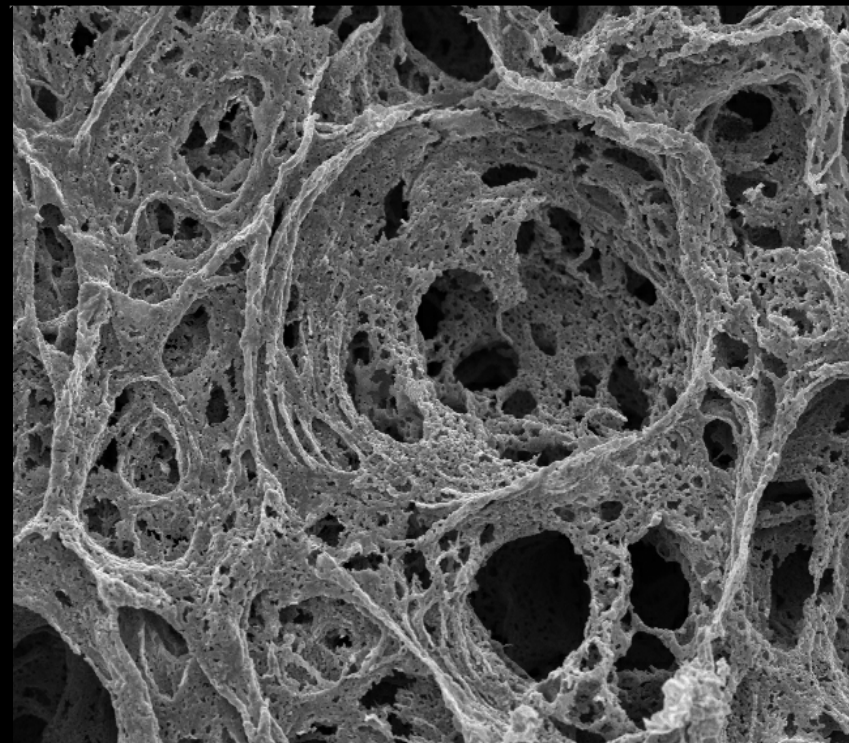
"Exploring the Physics of Self-assembled Nano-porous Structures"

by

Frank Peiris

Professor of Physics
Kenyon College

Within the last decade, exciting research has been devoted to the study of self-assembled nano-porous structures, which are fascinating from both a theoretical as well as a technological point of view. Because the self-assembling techniques control a host of parameters, including the pore diameter, porosity, and crystallinity, these structures offer a unique platform to investigate novel concepts in physics, chemistry, and materials science. In this talk, I will outline research related to titania-based nano-porous structures and discuss their structural, optical, and mechanical properties. Specifically, Raman measurements — conducted on samples that were annealed at different temperatures — indicate a red-shift with respect to temperature. It will be argued that the red-shift can be explained in terms of a phonon confinement model, manifested due to the nano-crystalline aspect of these structures. Additionally, a technique called ellipsometric porosimetry, mobilized to obtain pore characteristics, including the measurement of Young's modulus by analysing the adsorption and desorption isotherms, will be discussed. Finally, several applications of nano-porous structures will be highlighted, paying close attention to the fabrication of a breathalyzer and an optical-nose.



FALL Physics
2016 COLLOQUIUM SERIES

Friday, September 9, 2016 - 3:10 p.m.

Franklin Miller, Jr.
Lecture Hall (RBH 109)

Reception to follow.