



Physics Colloquium



Thursday, November 12th at 3:30 pm in SC 234

Dr. Felicia S. Manciu

University of Texas at El Paso

Drude model analysis and confocal Raman microscopy investigations of boron-doped diamond films

Boron-doped diamond has seen a substantial increase in interest for use as electrode coating materials for electrochemistry and studies of deep brain stimulation mechanism. To demonstrate the capabilities of confocal Raman mapping in providing detailed and accurate analysis of a series of boron-doped polycrystalline diamond films grown by chemical vapor deposition, in this study we combine such results with information from more conventional techniques such as scanning electron microscopy (SEM) and infrared (IR) absorption spectroscopy. SEM images, which show uniform distribution of film crystallites, have the limitation of being unable to differentiate the exact distribution of boron in the diamond. Confocal Raman mapping not only provides information about material composition at the molecular level, but also images the local distribution of pure diamond, boron-doped diamond, and C sp^2 impurities. We also present an alternative, more accurate method for determining important characteristics, including conductivity, time constant and concentration of carriers of such thin films by using the signature of their Drude-like metallic behavior in the far-IR spectral range.

Refreshments at 3:00 pm in SC 103