

T_CSAM Bi-Weekly Brown Bag Seminar

Texas Center for Superconductivity and Advanced Materials



Dr. Alexander Litvinchuk

Research Associate Professor,

T_CSAM and Department of Physics, University of Houston

“Optical Spectroscopy of Manganese Oxides and Advanced Semiconducting Materials and Structures”

Thursday, October 14, 2004

Room 102, Houston Science Center

University of Houston

12:00 noon – 1:00 p.m.

Abstract

Part of research activities within the Raman & Infrared Research Lab. of T_CSAM will be overviewed. Using ultra-short period InAs/AlSb superlattices and doped GaAs:N semiconducting films as examples we will demonstrate capabilities of optical spectroscopic techniques in the non-destructive characterization of advanced materials, which yields information on structure stability, spatial distribution and/or depth profile of dopants and impurities, bound and free charge carriers, their mobility, etc. Further, we will examine optical properties, charge and lattice dynamics of La_{1/2}Ca_{1/2}MnO₃, which exhibits a rich phase diagram and a variety of intriguing properties due the delicate interplay of spin, charge, lattice, and orbital degrees of freedom. We will present the experimental evidence for the existence of an insulating ground state, development of the charge density waves, and opening of a gap in the excitation spectrum at low temperatures. Phonon and crystal-field excitations of hexagonal HoMnO₃ single crystals will also be analyzed with the emphases on the anomalies due to antiferromagnetic Mn ordering.

Brief Bio

Dr. A.P. Litvinchuk graduated from the National University of Ukraine (Kiev, 1980) and received his Ph.D. (1983) and DSc (1989) degrees from the Institute of Semiconductor Physics of the Ukrainian Academy of Sciences. In 1990-1997 he has been affiliated with the Technical University of Berlin (Germany), Chalmers University of Technology (Gothenburg, Sweden), and Max-Planck-Institute for Solid State Research (Stuttgart, Germany). He was awarded the European Community Fellowship (Brussels, Belgium, 1995), Fellowship of the Max-Planck Society (Munich, Germany, 1992), Alexander von Humboldt Fellowships (Bonn, Germany, 1991, 1990), and the Honor Medal of the National Academy of Sciences (Kiev, Ukraine, 1988). Since 1997 he is a Research Associate Professor at T_CSAM. Dr. Litvinchuk's research interests include optical properties of solids (superconductors, semiconductors, insulators, ionic conductors), lattice dynamics, Raman and Infrared spectroscopies. He co-authored over 155 refereed publications and a number of reviews and book chapters, including “Infrared-Active Vibrations of High-Temperature Superconductors: Experiment and Theory. - in “*Physical Properties of High Temperature Superconductors IV*”, ed. by D.M. Ginsberg, (World Scientific, Singapore, 1994), pp.375-469 (with C. Thomsen, and M. Cardona).

Persons with disabilities who require special accommodations in attending this lecture should call (713) 743-8210 as soon as possible.

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