NUS National University of Singapore | Department of Mechanical Engineering
Faculty of Engineering

You are cordially invited to our:
Department Seminar

Topic: **Desorption Induced by Electronic Transitions from Ionic Crystals: Classical versus Quantum Approach**

Speaker: **Dr Leszek Markowski**
Department of Emission Electronics, Institute of Experimental Physics, University of Wrocław, Poland

Date: **Monday, 4 March 2013**

Time: **2.00pm to 3.00pm**

Venue: **EA-02-14** *(map of NUS can be found at http://map.nus.edu.sg/)*

Abstract

It is well known that irradiation of the solid with electrons or photons can cause its decomposition. This process, or, more adequately processes, is realized mainly by desorption of atoms or ions and is very important from technological point of view. Many different models of these phenomena for various systems have already been proposed (eg. Menzel-Gomer-Redhead or Antoniewicz model). Unfortunately, until now none of existing models has given a proper value of the desorption yield and, simultaneously, a correct kinetic-energy distribution of emitted particles with comparison to the experimental observations.

In the case of ionic crystals, especially when the ions desorption is followed by interatomic Auger's transitions and proceeds in accordance with the Knotek-Feibelman mechanism, three potentials are involved in the desorption process and thus three potentials are needed for its correct description.

In this talk a classical, quasi-quantum and quantum description of the positive ion desorption from ionic crystal surface will be discussed and compared. It will be shown that the quantum description allows us to predict some quantum effects, such as a periodicity of small oscillations on the kinetic energy distribution curves (predicted by Wave-Packet Squeezing model) and emission through a temporarily existing potential barrier from the temporary bounded states located above the vacuum level. Moreover, both the ions desorption efficiency and their kinetic-energy distribution are for the first time in agreement with the experimental results.

About the Speaker

Prof. Leszek Markowski received his MSc and PhD from Faculty of Physics and Astronomy, University of Wroclaw in 1986 and 1994, respectively. Between 2004 and 2012, he served as Vice-Director of the Institute of Experimental Physics at University of Wroclaw and now a Full Professor and Head of Emission Electronics Division at the Institute of Experimental Physics, University of Wrocław. He is also the President of Polish Vacuum Society. Due to his contributions to science and services he has received a number of awards from Wrocław University and President of Poland.

**** Admission is free. All are welcome to attend. ****