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REFERENCE: Short Term Scientific Mission, COST P9
Beneficiary: Bratislav MARINKOVIC, Institute of Physics Belgrade
Host: Jan Dusan SKALNY, Comenius University Bratislava
Period: from 15/05/2004 to 22/05/2004 Place: Bratislava - 84248 (SK)
Reference code: COST-STSM-P9-00192

SCIENTIFIC REPORT

PURPOSE OF VISIT

This visit was the first established collaboration between liders of two laboratories: Laboratory for Atomic Collision Processes, Belgrade and Plasma Department at Comenius University, Bratislava. The purpose of the visit was the exchange of experiences related to study of excitation processes of molecules by electron impact. Excitation processes are investigated in both laboratories both in vacuum and under atmospheric pressure. At very low pressure conditions, experiments comprise binary collisions between low energy electrons and molecules manly in ground state. At atmospheric pressure these collisions are studied via corona discharges.

DESCRIPTION OF THE WORK CARRIED OUT DURING THE VISIT

During the visit B. Marinkovic was acquainted with the undergoing research activities at Plasma Department of Comenius University, Bratislava. He had discussions with researchers involved in the investigations of collisional processes occurring in plasma of different types. Also, some of current applications of plasma treatment of materials are presented by host colleagues. In this discussions several researchers were involved, first, Prof. RNDr. Jan Dusan Skalny with experiments in corona discharges, than, Dr. Stefan Matejcik with experiments in electron attachment and ionization, Dr. Cernak with experiments on atmospheric pressure diffuse coplanar surface discharge for surface treatments, and others.

During the visit a seminar was given by B. Marinkovic on current experiments in Belgrade laboratory with recently obtained results in electron atom and electron molecule collisions. Title of given seminar was: "*Electron scattering experiments – recent results on some atoms, metal – vapours and molecules*". After the seminar a discussion took place conducted by Prof. RNDr. Peter Lukac, head of Department of Plasma Physics.

During the further discussions, the possibilities of future collaboration in electron interactions with biomolecular systems were explored. The temperature dependences of interactions with specific biomolecules such as alanine were noticed. It was also pointed out that there is a need for absolute cross measurements for ionization processes, grand total as well as partial. Some of these ionization cross sections are not known at all and some are known with low accuracy. At laboratory in Comenius University, ionization processes are studied in relative not absolute unities, while in Belgrade laboratory experimental apparatus designated for total ionization cross section measurements is not in operating conditions.

DESCRIPTION OF THE MAIN RESULTS OBTAINED

- Researchers are acquainted with the current research activities in two laboratories: Laboratory for Atomic Collision Processes, Belgrade and Plasma Department at Comenius University, Bratislava.
- Research on electron interactions with biomolecules will be continued in coordinated manner biomolecules of interest are glycine and alanine.
- Research on corona discharges will be continued in order to investigate molecular processes relevant for ionosphere and those of atmospheric interest.

FUTURE COLLABORATION WITH HOST INSTITUTIONS

The future collaboration with host institution is envisaged in the area of binary collisions of electrons with molecules and investigation of temperature dependences of these interactions. These include measurements of partial ionization cross sections for molecules of biological interest. Future collaboration is also envisaged in area of corona discharges and applications of plasma surface treatment.

The visit of Prof. RNDr. Jan Dusan Skalny to Belgrade Laboratory for Atomic Collision Processes is scheduled for this year.

PROJECTED PUBLICATIONS/ARTICLES RESULTING OR TO RESULT FROM THE STSM

At this moment joint publications are not projected as this is the first contact between two laboratories. This will be addressed during the visit of Prof. J. D. Skalny to the Belgrade laboratory.

Dr. Bratislav Marinkovic
Institute of Physics, Belgrade
Head of Laboratory for Atomic Collision Processes

Belgrade, 10.05.2004.

CONFIRMATION BY THE HOST INSTITUTE OF THE SUCCESSFUL EXECUTION OF THE MISSION

The visit of Dr. Bratislav Marinkovic was underdone with success and according the planed activities.

Prof. RNDr. Jan Dusan Skalny
Department of Plasma Physics, Comenius Univ.

Bratislava, 11.05.2004.