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COVER SHEET
FOR TRIP REPORTS SUBMITTED TO THE
OFFICE OF ENERGY RESEARCH

SL 06 1990

Destination(s) and Dates for
Which Trip Report Being Submitted: Venice, Italy, September 19-23, 1988

Name of Traveler: L. G. Christophorou

Joint Trip Report Yes
 No

If so, Name of Other Traveler(s): _____

MASTER

JB

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ORNL

FOREIGN TRIP REPORT

ORNL/FTR-3062

DATE: October 6, 1988

SUBJECT: Report of Foreign Travel of L. G. Christophrorou,
Physicist, Health and Safety Research Division

TO: Alexander Zucker

FROM: L. G. Christophorou

PURPOSE: Attend IX International Conference on Gas Discharges and Their Applications.

ABSTRACT: The traveler attended the IX International Conference on Gas Discharges and Their Applications held in Venice, Italy, September 19-23, 1988. He was a member of the International Organizing Committee of the conference, chaired a scientific session, presented a paper, and participated in scientific discussions and the planning of the next conference. Also, he exchanged research information and ideas on electron, ion, and laser interactions in fluid media with many participants.

The conference was attended by about 300 participants from throughout the world. Over 200 papers were presented covering the many and varied research areas which underlie the broad spectrum of applications in this area.

Among the basic research areas covered were: electron motion in gases and liquids, electron attachment and detachment processes mainly in gases, electron impact ionization in gases (and to a very limited extent in liquids), photophysical and laser interaction processes in gases, ion-molecule reactions and plasma chemistry, Penning ionization processes and computational methods as applied to modeling of electron transport and gas discharges.

Foremost among the many applied areas covered by the conference were those on breakdown initiation and gaseous insulation, pulsed-power switching, plasma processing and surface treatment, use of gas discharges to clean and improve the quality of environmental air, and the development of light (especially laser) sources. In this regard, the invited lecture by Professor S. Masuda on "Flue Gas Treatment and Precipitators" was most interesting.

Of special interest to the traveler and his research programs at Oak Ridge National Laboratory (ORNL) were the many reports on Boltzmann calculation of electron energy distribution functions for polyatomic gases for which inelastic processes are too large, photodetachment and collisional detachment, internal vibrational energy distributions of hot molecules, basic electron and ion transport in gases, ion-molecule reactions in polyatomic gases especially atmospheric freons and halocarbons, dissociative electron attachment to hydrogen halides and freons, electron attachment and detachment in O_2/N_2 media as a function of H_2O content, electron detachment in N_2O , clustering phenomena and their role in gas discharge initiation, and the variation of the excimer laser pulse characteristics with the nature of the fill gas and electrode geometry. These presentations led to considerable discussions and to some new ideas for future research at ORNL (for example, the role of H_2O , clustering, and temperature in the electron attachment/detachment properties of air). A number of speakers generously referred to the ORNL work in these areas. In his invited lecture on "Pulsed Power Technologies," Dr. Arthur Guenther of Los Alamos National Laboratory repeatedly credited ORNL work for important contributions.

The traveler's paper entitled "Electron Attachment Properties of Excited Dielectric-Gas Molecules and Their Possible Use For Pulsed Power Switching" has been well received and has been followed by extended discussion in the formal session and subsequently in informal meetings.

The traveler also chaired a scientific session on "Basic Processes" and participated in meetings of the International Organizing Committee of the conference. In addition, he chaired a meeting of those committee members of the International Symposia on Gaseous Dielectrics who were present at the conference to discuss the future of these Symposia, which have been organized and hosted by ORNL/DOE over the last 14 years. This small group of committee members was quickly joined by many other participants from around the world who strongly urged us to organize the next (Sixth) International Symposium on Gaseous Dielectrics in Knoxville in the spring/summer of 1990.

During the last day of the conference, the International Organizing Committee met to decide the future course of these conferences. It was announced at that meeting that many European institutions requested to host the next (Tenth) Conference. To the surprise of the traveler, the International Committee requested that the traveler and his colleagues at ORNL and the University of Tennessee organize the next Gas Discharges Conference in Knoxville, Tennessee, jointly with the next (Sixth) International Symposium on Gaseous Dielectrics. This will be the first time that the Gas Discharges Conference will be held outside Europe. The traveler is discussing this proposal with ORNL and the University of Tennessee leadership and colleagues in order to prepare our response to the International Committee.

SUMMARY

In summary, this has been a most interesting and beneficial meeting. The traveler profited from the presentations, discussions, and contacts at the meeting, and the Laboratory's programs and work were well represented, projected, and recognized. The traveler is grateful to the Laboratory and DOE for their support to attend this Conference.

APPENDIX

Persons Contacted

The traveler contacted a large number of participants working on both the basic and applied aspects of electron, ion, and photon interactions in fluids. Also, the traveler discussed our programs with a number of young scientists interested in working with us in the future.

Itinerary

9/15 - 9/17/1988	Travel from Oak Ridge, Tennessee, to Venice, Italy
9/18 - 9/23/1988	Participation at the conference
9/24 - 9/25/1988	Travel from Venice, Italy, to Oak Ridge, Tennessee

Bibliography Acquired

Papers presented at the conference.
A number of preprints.
References to recent work on electron-existed molecule interactions.

DISTRIBUTION

1. Assistant Secretary for International Affairs, DOE, Washington, DC
2. R. W. Wood, Acting Associate Director, Office of Health and Environmental Research, DOE, Washington, DC
3. J. A. Lenhard, DOE/ORO
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- 5-6. Office of Scientific and Technical Information, DOE
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