International Symposium on Electron-Molecule Collisions and Swarms

July 30 – August 2, 2003
Průhonice near Prague
Czech Republic

A Satellite of the XXIII ICPEAC

EMS-03

Program and Abstracts

Hosted by
Charles University, Prague
Academy of Sciences
Czech republic

Program

Organizing Committee
Contact
Important dates
Call for papers
Registration
Program
Costs and Payment
Accommodation
Conference site
Maps
Sponsors

Scope and Program

The International Symposium on Electron (Positron) – Molecule collisions and Swarms (EMS) is held biennially as a satellite of the International Conference on Photonic, Electronic, and Atomic Collisions (ICPEAC) to promote the growth and exchange of scientific information in the field. The special emphasis of the present symposium, EMS'03, will be on newer rapidly growing areas such as electron collisions with biological molecules, clusters and fullerenes, electron collisions with molecules absorbed on surfaces, and applications to industrial and fusion plasmas. The EMS'03 International Organizing Committee invites papers on the aforementioned topics, as well as on the traditional broad field of electron (positron) – molecule collisions and swarms and their role in low-temperature plasmas, radiological/environmental applications, and space sciences.

Preliminary schedule

Wednesday	July 30	18:00 Welcome reception
Thursday	July 31	talks and posters
Friday	August 1	talks and posters, banquet
Saturday	August 2	extension of the Conference*)

*) Morning transfer to Charles University Prague - discussion forum, 10:00-12:00, on the future and perspectives of the physics of electron (positron) - molecule collisions.
Speakers: 1. Leon Sanche
2. Nigel Mason
3. Franco Gianturco
Free afternoon in Prague, or 14.00-17.00, guided tour through the history of physics and astronomy in Prague (Marcus Marci, Tycho de Brahe, Johannes Kepler, Bernard Bolzano, Albert Einstein, ...), 17:00 brief reception in the historical building of the Charles University and organ concert.

List of invited speakers and preliminary titles of invited talks

1. **Laurence Campbell, Flinders University**
   "The Importance of Electron Impact Cross Sections in Understanding Thermospheric Processes."
2. **Loucas G. Christophorou, Athens**
   "Electron Collision Cross Sections for Plasma Processing Gases: Revised Values and Data Needs."
3. **Martin Cizek, Charles University, Prague**
   "Interchannel coupling in associative detachment"
4. **Roman Curik, Heyrovsky Inst., Prague**
   "Scattering calculations on vibrational electron energy loss spectra."
5. **Gleb Gribakin, Belfast**
   "Positron Annihilation on Molecules."
6. **Gregorz Karwasz, Trento**
   "Electron diffision coefficients in triatomic gases - measurements and models."
7. **Anna Lafosse, Orsay**
   "Electron H/Si(100) interaction: H- desorption and surface vibrations."
8. **Mu-Tao Lee, Sao Carlos, Brazil**
   "Studies on vibrational excitation of H2 by electron impact."
9. **Nicolas Lorente, Toulouse**
   "Mode selected single-molecule chemistry with the scanning tunneling microscope."
10. **Toshiaki Makabe, Keio University, Yokohama**
    "Dry Etching as Integrated Fundamental Processes in a Plasma-Surface Interface."

11. **Thomas N. Rescigno, Livermore**
    "Resonant Vibrational Excitation of CO2 by Electron Impact: Nuclear Dynamics on the Coupled Components of the \Pi_u Resonance."
12. **Karl-Heinz Rieder, FU Berlin**
    "Doing physics and chemistry with single atoms and molecules: The STM as operative tool."
13. **Robert Robson, Canberra**
    "The enduring electron-hydrogen vibrational cross section controversy: Is a new transport theory required for molecular gases?"
14. **Martin-W. Ruf, Kaiserslautern**
    "Structure in high resolution electron attachment spectra for molecules and clusters."
15. **Jean-Pierre Schermann, Villeatneus**
    "Probing non-covalent interactions between molecules of biological interest by dipole-bound anion formation."
16. **Ioan F. Schneider, le Havre**
    "Reactive collisions between electrons and molecular ions in hydrogen, atmospheric and noble gases."
17. **Isao Shimamura, Riken**
    "Complex potential description of positron impact processes."
18. **Clifford M. Surko, San Diego**
    "Low-energy positron-molecule interactions -- evidence for resonances and bound states."
19. **Petra Swiderek, Koeln**
    "Cross sections for low-energy electron-induced reactions in the condensed phase."
20. **Michael Probst, Innsbruck**
    "Electron Molecule Collisions - Experiments and their Interpretation by Quantum Chemical Calculations."
21. **Mark Thachuk, UBC, Vancouver**
    "Collision-Induced Alignment in Drifting Molecular Ions."
22. **Daniel Zajfman, Rehovot**
    "Manipulating the Rotational Energy of Molecular Ions with Cold Electrons."
23. **Jean-Pierre Ziesel, Toulouse**
    "Total scattering of cold electrons by molecules."

NORMALIZATION OF THE MEASURED RELATIVE ELECTRON DIFFERENTIAL CROSS SECTIONS FOR EXCITATION OF H_2S

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Abstract. We have measured relative electron differential cross sections (DCSs) for excitation of the valence and Rydberg states of H_2S at electron impact energies from 10 to 100 eV and angular range from 0 to 150 degrees. Measurements were obtained by using the electron spectrometer with crossed electron-molecule beam arrangement. Energy loss spectra have been obtained at particular impact energy and scattering angle (in Fig. 1 one of the representative spectra is shown) Spectra show two distinct regions, the first with broad continuum with little discrete structure and the second region with Rydberg states converging to the first ionization potential at 10.472 eV. The spectra are compared with available photoabsorption spectra [1,2]. Relative data have been normalized through a forward scattering function for the generalized oscillator strength (GOS) [3].

[1] Watanabe K and Jursa A S, 1964 *J. Chem. Phys.* **41** 1650.

[2] Masuko H. *et al.,* 1979 *Can. J. Phys.* **57** 745.

[3] Avdonina N B, Felfli Z and Msezane A Z, 1997 *J. Phys. B: At. Mol. Opt. Phys* **30** 2591.

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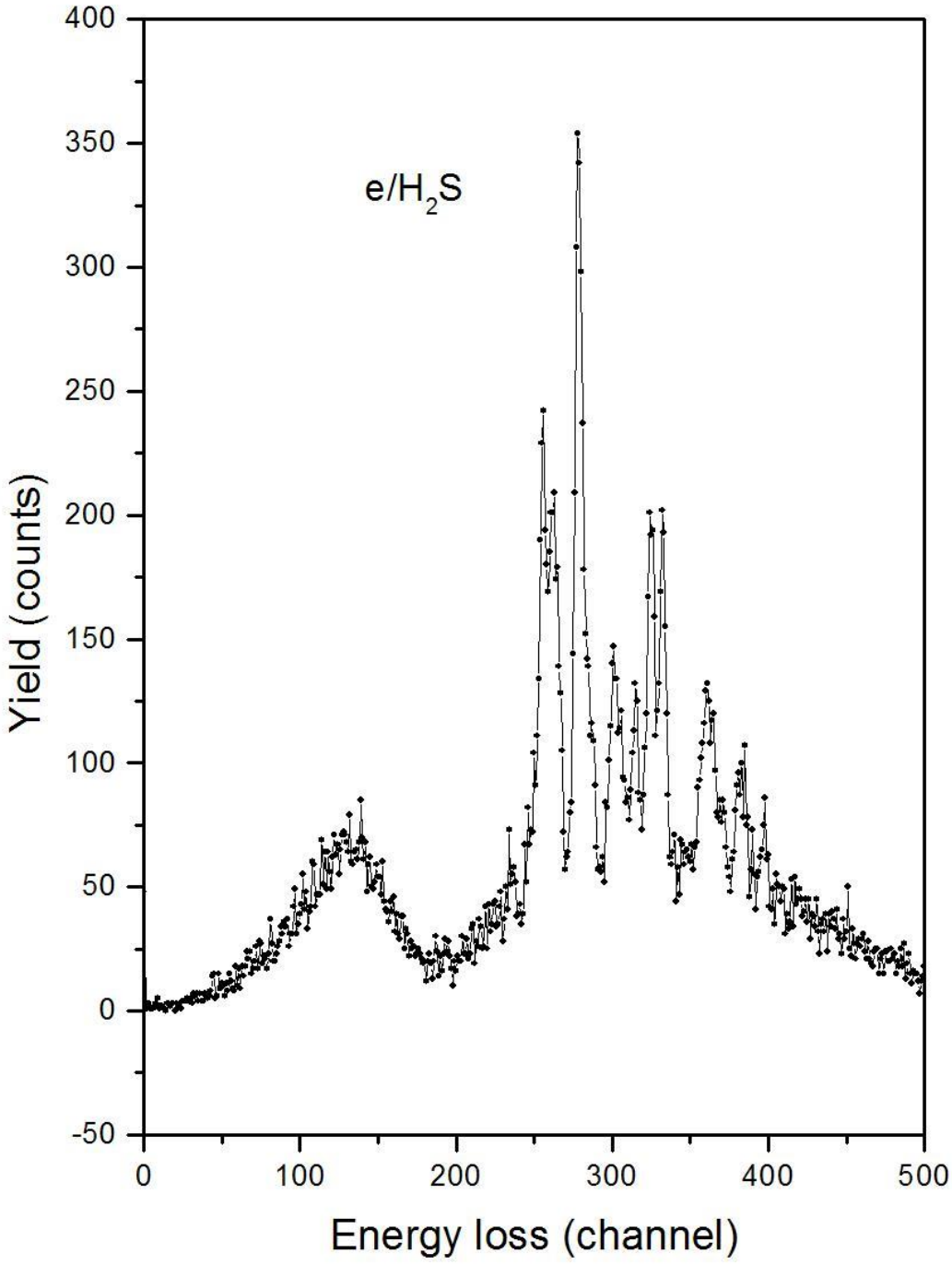
e/H2S
Yield (counts)
Energy loss (channel)
400
350
300
250
200
150
100
50
0
-50
0
100
200
300
400
500

Fig. 1