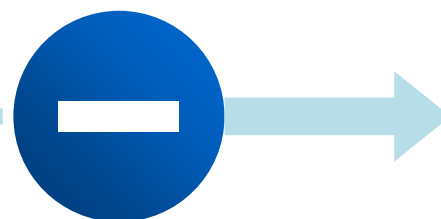


XVII International Symposium on Electron-Molecule Collisions and Swarms

22 - 25 July 2011
National University of Ireland Maynooth



Programme and Book of Abstracts



NUI MAYNOOTH
Ollscoil na hÉireann Má Nuad

XVI International Workshop on Low-Energy Positron and Positronium Physics &
XVII International Symposium on Electron-Molecule Collisions and Swarms
22 - 25 July 2011, Maynooth, Ireland

POSMOL 2011

XVII International Symposium on Electron-Molecule Collisions and Swarms

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Electron Scattering from Pyrimidine: Experimental and Theoretical Results and Comparison with Positron - Pyrimidine Scattering

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In this presentation we discuss our recent results for low-energy electron scattering from pyrimidine and the importance of pyrimidine as a model molecule in studying complex biological systems such as DNA bases. A comparison between electron and positron scattering from pyrimidine will also be made with the use of recently measured positron cross sections.

The last decade has seen an enormous interest in the mechanisms of low-energy electron interactions with biologically relevant molecules. This has been driven by the recognition that those interactions can play a major role in biological processes, including DNA damage [1]. Studies in this field have extended from relatively simple, biologically relevant molecules such as water, to complex molecular constituents of DNA, and DNA itself. Obtaining absolute experimental reaction rates for processes such as dissociative attachment is notoriously challenging and it is hence important to benchmark state-of-the-art theory against experimental results for other scattering processes such as elastic scattering, excitation, and ionization. Pyrimidine ($C_4H_4N_2$) is a model molecule to investigate both electron and positron interactions with DNA/RNA bases, as three of the five nucleobases (cytosine, thymine, and uracil) are pyrimidine derivatives. However there are few or no previous studies to be found in the literature on low energy electron and positron scattering from pyrimidine.

Absolute differential and integral cross sections for elastic scattering of low-energy electrons (3-50 eV) along with the cross sections calculated using the Schwinger multichannel variational technique, and a screening-corrected form of the independent-atom method, or the additivity rule, will be presented in this talk. Our recent measurements of absolute total, positronium formation, and differential elastic cross sections for positron scattering from pyrimidine will also be presented and compared with the corresponding electron results.

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[1] B. Boudaiffa, P. Cloutier, D. Hunting, M.A. Huels, and L. Sanche, *Science* **287**, 1658 (2000)