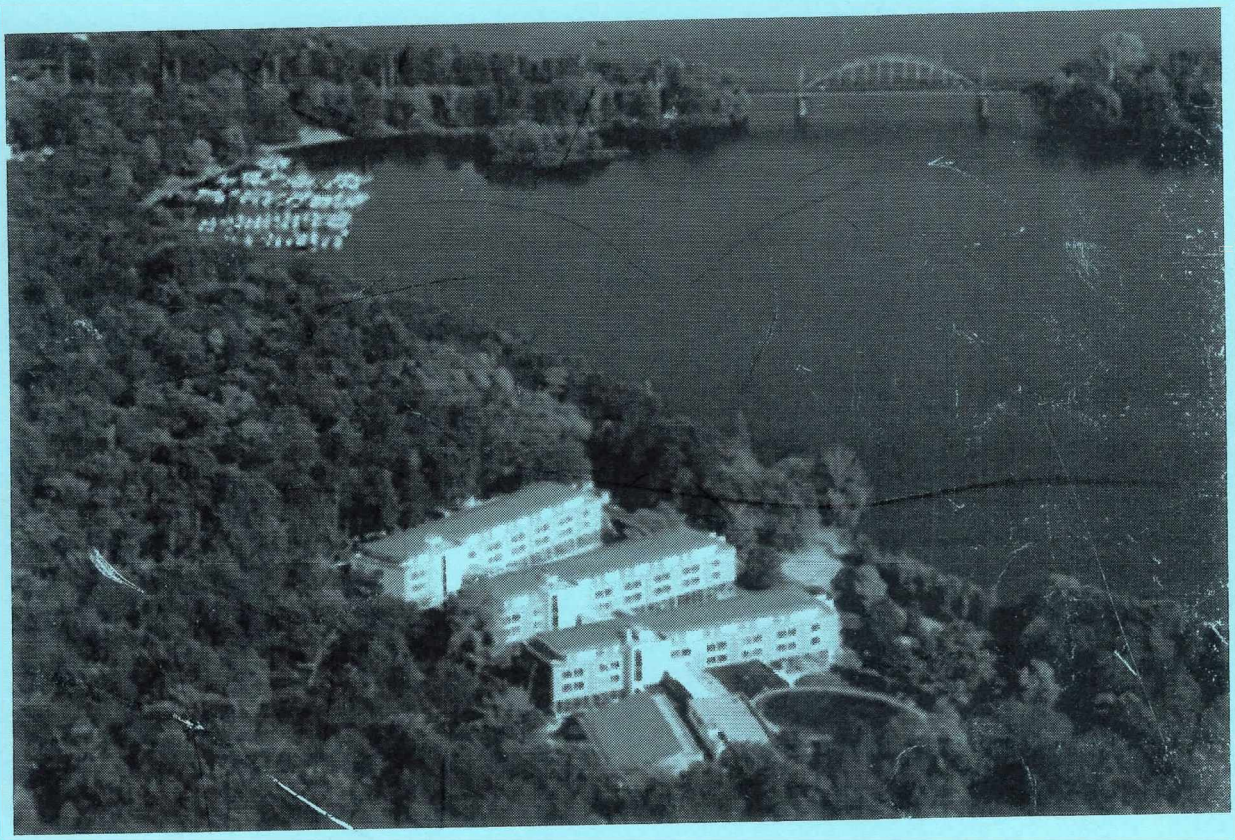
RADAM Conference 2005

17th-20th March 2005, Potsdam near Berlin, Germany

Radiation Damage in Biomolecular Systems



Conference within the COST P9 Action
supported by the European Science Foundation

International advisory board

Chair: Nigel Mason
Vice Chair: Michel Farizon

Marie-Christine Bacchus, *Lyon, France*
Marie Begusova, Prague, *Czech Republic*
Krzysztof Bobrowski, *Warsaw, Poland*
Henrik Cederquist, *Stockholm, Sweden*
Michel Farizon, *Lyon, France*
David Field, *Aarhus, Denmark*
Melvyn Folkard, *Middlesex, UK*
Bojidar Galutzov, *Sofia, Bulgaria*
Gustavo Garcia Gomez Tejedor, *Madrid, Spain*
Marie-Jeanne Hubin-Franskin, *Liège, Belgium*
Galina Kurchatova, *Sofia, Bulgaria*
Paulo Limao-Vieira, *Lisbon, Portugal*
Nigel.J. Mason, *Milton Keynes, UK*
Bratislav Marinkovic, *Belgrade, Serbia and Mont.*
Tilmann Märk, *Innsbruck, Austria*
Stefan Matejcik, Bratislava, *Slovakia*
Kevin G. McGuigan, *Dublin, Ireland*
Reinhard Morgenstern, *Groningen, Netherlands*
Massimo Olivucci, *Pisa, Italy*
Raymond O'Neil, *Maynooth, Ireland*
Herwig Paretzke, *Neuherberg, Germany*
Maurizio Persico, *Pisa, Italy*
Rita Plukiene, *Vilnius, Lithuania*
Bytaute Remeikyte, *Vilnius, Lithuania*
Paul Scheier, *Innsbruck, Austria*
Thomas Schlathölter, *Groningen, Netherlands*
Jan Skalny, *Bratislava, Slovakia*
Nikolaus Stolterfoht, *Berlin, Germany*
Béla Sulik, *Debrecen,* Hungary
Nathalie Vaeck, *Brussels,* Belgium
Luis Vazquez Martinez, *Madrid, Spain*
Marian Wolszczak, *Lodz, Poland*

Local organising commitee

Nikolaus Stolterfoht
Rolf Hellhammer
Przemek Sobocinski
Martina Bernburg

Conference site

Seminaris SeeHotel Potsdam
An der Pirschheide 40
14471 Potsdam
Germany

Host Institution

Hahn-Meitner Institut
Glienickerstrasse 100
Berlin GmbH
14109 Berlin
Germay

Sponsor

Hahn-Meitner Institut, Berlin

Preface

The COST Action RADAM (RADiation DAMage) was established by the COST Physics Committee as its ninth Action Programme (P9) in 2002. Funded for 4 years it was initially ratified by 14 European countries and was formally launched in November 2003. In the first 18 months the Action has arranged over 50 short visits involving over 30 research groups, supported 7 conferences and the number of the European countries formally joining the action has increased to 19. The main objective of the RADAM project is to obtain a detailed understanding of the fundamental interaction processes initiated by the deposition of various types of radiation in biological material. This also introduces the exciting prospect that it may be possible to manipulate the effects of ionizing radiation at a molecular level within the cell.

The Action is subdivided into 5 Working Groups each of which is devoted to a specific field. Thus, a wide range of complementary experimental and theoretical expertise is brought together under this Programme. The research requires an interdisciplinary approach to the interaction of photons, ions and electrons with bio-molecular systems. The elucidation of fundamental energy transfer and coupling mechanisms, ionization, charge transport, and reaction behaviour will in turn be used to develop models of track structures in irradiated media. Such models can be used to determine a more reliable quantification of human epidemiological experience when subject to low radiation doses.

The participants of the Action meet annually to discuss the progress of their common research work. The first Annual Workshop was held in Lyon from June 24th to 27th, 2004. The scientific programme of the Workshop in Lyon was structured by the individual Working Groups, which organized excellent talks devoted to their specialized topics. During the meeting of the Management Committee it was agreed that at the next Annual Workshop it would be preferable to provide time to Tutorial Speakers that can enhance the connections between the different Working Groups.

In 2005 the Annual Workshop of the COST Action RADAM takes place at Potsdam from March 16th to 20th. The conference site is the Seminaris SeeHotel, which is well known for successfully hosting workshops and conferences. In accordance with the recommendation of the Management Committee, the programme is structured so that about half the time is devoted to Tutorial Speakers, whereas the other half is devoted to specialized topics. To enhance the interdisciplinary connections, contributions from different Working Groups are mixed in some Sessions.

We wish you all a joyful conference communicating physics and finding new friends !

Nigel Mason
Chairman of the COST Action P9

Nikolaus Stolterfoht
Local Chairman of the RADAM05

Absolute energy and angle dependent cross sections for elastic electron scattering by tetrahydrofuran molecule

A. R. Milosavljevic[1], A. Giuliani[2], D. Ševiş[1], M.-J. Hubin-Franskin[2] and B. P. Marinkoviş[1]

[1] Institute of Physics, Pregrevica 118, 11080 Belgrade, Serbia and Montenegro
[2] Laboratoire de Spectroscopie d'Electrons Diffusés, Université de Liège, Institut de Chimie, Bâtiment B6c, B-4000 Liège, Belgium

We report absolute cross sections for elastic scattering of electrons by tetrahydrofuran (THF) molecule (C4H8O), in the energy range from 10 eV to 300 eV and the angular range from 10o to 110o. The investigation of THF, which is the DNA backbone sugar-like analogue, gives possibilities for better comprehending the effects of secondary electrons, induced by ionizing radiation, on the DNA sugar chain. In this context, some results for THF, considering vibrational excitation and dissociative electron attachment, for the impact energies up to about 30 eV, have been reported recently [1], [2]. However, according to our knowledge, there is no published data for elastic electron scattering by THF. Therefore, obtaining a set of absolute cross sections for elastic electron-THF scattering, in a large energy domain, is of interest for radiation biology and modeling of radiation damage processes, as well.

The experimental results that we report here have been obtained on two different apparatus, one placed in Liege and the other in Belgrade. The former one includes a monochromator and an energy analyzer, both of 150o hemispherical electrostatic type, and is characterized by a high energy resolution of about 45 meV. On this apparatus, the absolute differential cross sections (DCSs) for elastic electron scattering by THF have been obtained according to measurement of the ratio of the elastically scattered intensity of THF to that of N2. The other apparatus, placed in Belgrade, includes an electron gun and double cylindrical mirror energy analyzer, fitted with four-electrode zoom lens. The lowest energy resolution of about 0.5 eV is limited by thermal spread of incident electrons. However, on this apparatus the relative DCSs can be measured as a function of both scattering angle and incident electron energy and, hence, the absolute normalized, independent data set can be obtained according to a single absolute DCS value in the overlapping region. The angle dependent absolute DCSs at two overlapping incident energies are presented in figure 1(a,b). Also, a relative energy dependent DCS at 32o is presented in figure1.

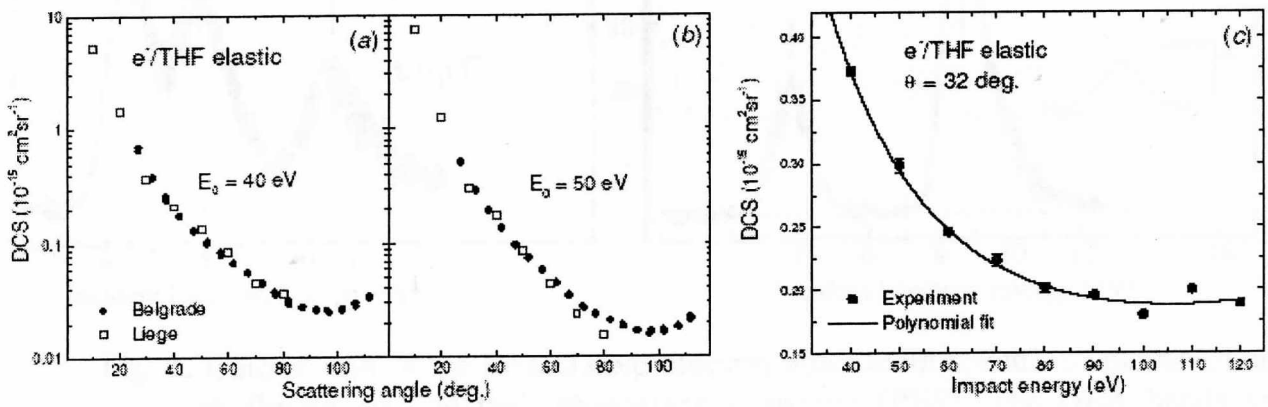


Figure 1. (a,b) Absolute angle dependent DCSs; (c) Relative energy dependent DCS.

[1] M. Lepage, S. Letarte, M. Michaud, F. Motte-Tollet, M.-J. Hubin-Franskin, D. Roy and L. Sanche, *J. Chem. Phys.* **109**, 5980 (1998)

[2] D. Antic, L. Parenteau, M. Lepage and L. Sanche, *J. Phys. Chem. B* **103**, 6611 (1999)