

**The Benelux Nuclear and Plasma Science Society
is pleased to invite you to the 1st IEEE Evening Event**

June 5, 2003, Club-House SCK•CEN

Boeretang 200, 2400 Mol

PROGRAM

- 15:45 What is IEEE ? an introduction by Benoît Brichard
16:00 THE RADFET: A BRIEF REVIEW a talk by Andrew Holmes-Siedle
16:45 Drink offered by IEEE-NPSS Benelux
17:30 End

This event is free and open to all participants, regardless membership. Registration is not required but highly appreciated and advised.

For information

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How to get there ? http://www.sckcen.be/sckcen_en/general/contact.shtml

IEEE Nuclear and Plasma Sciences Society

The Society encompasses all phases of nuclear and plasma sciences and engineering, including instrumentation, detection and measurement, particle accelerators, reactor systems, effects of radiation on materials and components, and applications.

On-line registration to IEEE <http://ewh.ieee.org/soc/nps/joinnpss.htm>

THE RADFET: A BRIEF REVIEW

A talk by Andrew Holmes-Siedle
Technical Director, REM Oxford Ltd.

ABSTRACT : RADFET technology for dose measurement is becoming mature. The RADFET (radiation-sensitive MOS field-effect transistor) is an integrating radiation dosimeter based on silicon technology; compared with conventional dosimeters, it has many advantages, which include (a) minute sensor size; (b) low cost; (c) entirely electrical sensor-reader interface; (d) all work at low voltages and currents; and (e) dynamic range from millirads to megarads; (f) remote and non-destructive reading. In simple language, it is an undemanding silicon chip which “knows the dose it has received” but can be thrown away when used. Compared with the usual assemblies of chambers and electrometers so common in radiation physics the description shows up enormous advantages. For medicine, its size makes it suitable for “Small field dosimetry”, in which the radiation physicist has to map, with great precision, the dose deposited in a field around a vital organ.

The idea was conceived in the late 1960s. Nearly 30 years later, the technology, based on a principle which can be called “the very-long-term trapping of electrical charge in an oxide film” has proved itself in some fields and is slowly coming of age in medicine. The originator of this technique gives a brief review of how and why the RADFET system works and discusses some applications.

DR. ANDREW HOLMES - SIEDLE : BIOGRAPHICAL NOTES

BSc(Dublin), Ph.D (Cambridge), C.Phys

Dr. Holmes-Siedle is a Chartered Physicist, director of the REM firms in Oxford and held professorial rank at Brunel University of West London, England. He is the founder and director of the REM companies which designs and manufactures sensor systems, including radiation monitors and which undertake consulting.

Born in Brighton, England, Dr. Holmes-Siedle graduated in organic chemistry from Trinity College Dublin in 1954, and did a Ph.D and post-doc. at Cambridge University from 1954 to 1960 on the transfer of energy within biological and chemical systems. From 1960 to 1962, with Hawker-Siddeley (now British Aerospace), he worked on communication satellite designs. Working from 1962 to 1971 in the USA, he was Manager of Radiation Effects at RCA Space Centre (now Lockheed Martin), supporting the design of operational spacecraft such as the NOAA weather satellites. The theme of his research work was the physics of defects in solids, the "radiation-hardening" of electronic devices and imparting longer lives to spacecraft.

Returning to Europe in 1972, he was Senior Fellow in the Physics Department of the University of Reading, England, initiating work on the effects of far-UV radiation in dielectric films on semiconductors. In 1975, he started up a new company, REM, to develop and produce a new invention, the space-charge dosimeter, sometimes called the RADFET. In 1992, he transferred his laboratory activities to Brunel University, forming the Centre for Radiation Damage Studies in the Physics and Electronics Departments. The work there included high-energy particle detection and silicon imaging devices.

Dr. Holmes-Siedle is co-author of the *Handbook of Radiation Effects*, an ESA Standard, now in its second edition, published by Oxford University Press. He is a Fellow of the Institute of Physics (IOP), a Senior Member of the Institution of Electronic and Electrical Engineers (IIEE) and a member of the IEEE Radiation Effects Committee. He has awards from NASA; IR-100; the IEEE Radiation Effects Award; a medal of the University of Montpellier, patents on a gas detector and a microengineered detector for the Ultraviolet.. He has written 60 research papers, two books and several industrial handbooks.

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