

## **Dietrich Schulte-Frohlinde is Sixth Recipient of Gray Medal**

The International Commission on Radiation Protection and Measurements (ICRU) is pleased to announce the L.H. Gray medal for 1989 will be presented to Professor Dr. Dietrich Schulte-Frohlinde at the ICRU Symposium to be held during the Congress of Radiology in Paris, 1-8 July 1989.

Professor Schulte-Frohlinde was born in Munich, Germany in 1924 and received his Diploma in physical chemistry from the University in Heidelberg in 1952. His post-graduate work was carried out under R. Kuhn and he received his Ph.D. in 1956. After a further three years at Heidelberg as a research assistant, Prof. Schulte-Frohlinde moved to Karlsruhe as Leader of the Radiation Chemistry Group and, in 1965, became Director of the Institut für Strahlenchemie at the Kernforschungszentrum. In 1969, he took over as Director of the Radiation Chemistry Department at the Max-Planck-Institut für Kohlenforschung in Mülheim, later to become the Max-Planck-Institut für Strahlenchemie, where he remains to the present day.

In his earlier years, Prof. Schulte-Frohlinde was particularly active in photochemistry and made numerous important and novel contributions concerning mechanisms of cis-trans isomerization and energy transfer in organic systems. His work with Eiben, on irradiated frozen alkaline aqueous solutions signaled a major entry into radiation chemistry. They correctly assigned the blue colour produced by  $\gamma$ -irradiation to the spectrum of the thermal electron trapped by solvation in the frozen matrix. This work was carried out independently of parallel pulse radiolysis studies of Boag, Hart and Keene that characterized the electron spectrum in liquid.

The discovery of the hydrated electron heralded a huge expansion of interest world-wide in free radical radiation chemistry involving many applications of the new technique of pulse radiolysis. Prof. Schulte-Frohlinde participated fully in this "explosion" and made many unique and valuable contributions to it, particularly in the field of chemical reactions initiated by hydroxyl radicals and other short-lived reactive species.

However, even in the Karlsruhe period, Prof. Schulte-Frohlinde was already becoming more and more intrigued by problems posed in molecular radiation biology. He was also attracted into the DNA field, partly by his own curiosity and partly by the fact that Karl Zimmer, also at Karlsruhe, believed very much in the importance of chemical processes in the mechanisms of radiation damage to cells. For over twenty years, he has devoted the major part of his research to the study of radiation-induced free radical reactions in DNA and its model compounds. Many and varied studies enabled Prof. Schulte-Frohlinde and his co-workers, particularly Clemens von Sonntag, to track down and characterize many of the free-radical reactions involved in the extraordinarily complex mechanisms of DNA radiolysis. Classification of abstraction, addition, transfer, migration, and other types of free radical reaction in DNA and its constituent bases, sugars and phosphate esters enabled him and his team to propose, investigate and eventually verify, a detailed mechanism of DNA strand breakage which included all the separate, but inter-linked

steps from the initial chemical damage through to the final products. Other studies brought together into a comprehensive mechanism, the methods, whereby peroxy radical reactions were involved in, and contributed to, oxygen-mediated enhancement of DNA strand break.

Prof. Schulte-Frohlinde is also an accomplished experimentalist and brought together in the work of his group various techniques, including product analysis, electron-spin resonance and pulse radiolysis involving both optical and conductometric methods of following fast chemical reactions.

During his career, Prof. Schulte-Frohlinde has published over 230 papers, books or monographs and has established himself as an international figure in radiation chemistry, particularly in areas related to mechanisms in radiation biology. He is the first chemist to receive the Gray Medal and the ICRU is honoured to include him in the list of distinguished recipients.