SCIENCE OF HYDROGEN & ENERGY AWARD

The “Science of Hydrogen & Energy” award is a prize for an extraordinary contribution to the sciences of hydrogen. The aim is to award a prize to a renowned scientist for hid/her lifetime achievements.

Already back in 1866, Thomas Graham published a paper [T. Graham, Philos. Trans. R. Soc. London 156, 399 (1866).], in which he described the solubility of hydrogen in palladium and the corresponding volume expansion he observed. 111 years later a paper by Ronald Griessen and his colleagues entitled “De Haas-van Alphen effect in palladium-hydrogen alloys” appeared. The De Haas-van Alphen effect is a quantum mechanical effect and is due to Landau quantization of electron energy in an applied magnetic field. Ronald Griessen has subsequently investigated the thermodynamics of palladium films and the isotope effect on the electronic structure of hydrides. Furthermore, the effect of anharmonicity and Debye-Waller factor on superconductivity of PdH_x and PdD_x have been studied by Ronald Griessen before he developed a semi-empirical model for the heat of solution of hydrogen in transition metals. He also studied the trapping energy for hydrogen on lattice defects as well as the heat of solution of disordered transition metals. The volume expansion upon hydrogen absorption, the Gorsky-effect, the diffusion, electromigration and the hydrogen diffusion in magnetig fields are just a few other subjects treated and described by Ronald Griessen. Then he decided to test the world of high pressure hydrogen and described the properties of hydrides formed at very high pressure as well as the properties of hydrogen gas in a wide temperature and pressure range. During the intense investigation of superconductors and metal hydrides under high hydrogen pressure in a diamond anvil cell Ronald Griessen discovered the switchable optical properties of yttrium and lanthanum hydride films. This discovery has stimulated him to investigate thin films with optical methods and to develop new methods for the combinatorial search of new hydride phases as well as for the determination of the thermodynamic parameters e.g. stability and kinetics of the hydrides. Furthermore, new applications for hydrides as hydrogen detectors and optical filters have been developed in his group.

Ronald Griessen’s work is highly appreciated in the world-wide hydrogen community and his contributions to the scientific knowledge are of enormous importance. Therefore, we are proud to award the first “Science of Hydrogen & Energy” prize to Ronald Griessen.

Curriculum Vitae Ronald Griessen

1964 Baccalauréat, Gymnase français, Bienne, Switzerland

1964 – 1969 Study of Physics and Mathematics at the Swiss Federal Institute of Technology (ETH) in Zürich. Diploma thesis on "Magnetostriction of type-II superconductors".

1969 - 1973 PhD student in the Low Temperature Physics Group of Prof. Dr J.L. Olsen at the ETH. PhD-thesis on "Oscillatory Magnetostriction and the stress dependence of the Fermi Surface of Al, In, Zn and Mg"

1974 - 1976 Research Associate at the McLennan Physical Laboratory of the University of Toronto, Canada. Work on the electronic structure of spin-density-wave systems and quantum oscillations.

1976 Visiting scientist at the ETH Zürich.

1976 - 1980 Senior lecturer at the Vrije Universiteit in Amsterdam.

1980 - now Full Professor in charge of the Department of Condensed Matter Physics.

2005 – now Chairman of the Board of Governors of FOM (Fundamental Research of Matter) Chairman of the Physics Division of NWO (Netherlands Organisation for Scientific Research)

Prize: 2001 Physica Prize of the Dutch Association of Physics for work on switchable mirrors