

Second Laureate Applied Research



- ◆ **Researcher:** Prof. Ronald Frahm
- ◆ **Nationality:** Germany
- ◆ **Date of Birth:** March 2, 1954
- ◆ **Field:** Physics
- ◆ **Position:** Professor
- ◆ **Scientific Affiliation:** Department of Physics, University of Wuppertal, Wuppertal, Germany.
- ◆ **Research Work Title:** New methods in high precision and time resolved X-ray absorption spectroscopy using synchrotron radiation.

Abstract:

X-ray absorption spectroscopy allows element specific investigation of the atomic short range order and chemical state in solids, liquids, gases and surfaces. Using the continuous spectrum of the extremely intense synchrotron radiation, it complements X-ray diffraction. Investigations of nanoparticles and dilute components are feasible. The Quick Scanning EXAFS (QEXAFS) technique was developed for time dependent studies of fast reactions in in-situ environments down to the millisecond range. It is now used at all major synchrotron radiation facilities worldwide. Unique understanding of catalysts in operation and of chemical reactions became possible. Furthermore, we added new insights into multiple shell excitations resolving long standing inconsistencies in literature, improved X-ray monochromators (in-situ crystal changes, crystal benders, etc.) and were involved in the development of new techniques like spin-polarized EXAFS (SPEXAFS) for investigations of magnetic materials, Yoneda-XAFS for the investigation of rough surfaces, and reflectivity measurements showing the amorphous structure of monoatomic cryodeposited thin films.

Biography:

DProf. Ronald Frahm started working with synchrotron radiation during his doctoral thesis (Univ. Kiel, Germany), worked as postdoc at the IBM T.J. Watson Research Center in Yorktown Heights (USA) and became staff member at HASYLAB (DESY, Hamburg, Germany) afterwards. As invited scientist at LLNL (Livermore, USA) he performed time resolved experiments at SSRL and NSLS. He finished his habilitation in 1993 at the Univ. Rostock (Germany). In 1996 he became associate professor (Univ. Düsseldorf, Germany) and in 2000 full professor (Univ. Wuppertal, Germany). His experience covers e.g. absorption spectroscopy, anomalous and surface X-ray diffraction. He invented the quick scanning EXAFS (QEXAFS) technique and performed time resolved and tomographic XAFS studies. Furthermore, he worked in national and international committees of scientific and political importance, served 10 years as co-editor of the Journal of Synchrotron Radiation and is editor of Synchrotron Radiation News from 1992 on.

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