Prof. Kai Manne Börje Siegbahn
Professor at the University of Uppsala; Nobel Prize in Physics, 1981

Most important awards, prizes and academies

Academies: Royal Swedish Academy of Science; Royal Swedish Academy of Engineering Sciences; Royal Society of Science; Royal Academy of Arts and Sciences of Uppsala; Royal Physiographical Society of Lund; Norwegian Academy of Science; Royal Norwegian Society of Sciences and Letters; National Academy of Sciences; Honorary Member of the American Academy of Arts and Sciences; Honorary Member of Societas Scientiarum Fennica; Comité International des Poids et Mesures, Paris; President of the International Union of Pure and Applied Physics, IUPAP (1981-84); Pontifical Academy of Sciences; European Academy of Arts, Sciences and Humanities; Academia Europaea; Member of the Board of the Ioffe Institute, St Petersburg (1999). *Awards*: The Lindblom Prize (1945); Björkén Prize (1955, 1977); Celsius Medal (1962); Sixten Heyman Award, University of Gothenburg (1971); Harrison Howe Award, Rochester (1973); Maurice F. Hasler Award, Cleveland (1975); Charles Frederick Chandler Medal, Columbia University, New York (1976); Torbern Bergman Medal (1979); Nobel Prize in Physics (1981); Pittsburgh Award of Spectroscopy (1982); Röntgen Medal (1985). Honorary Degrees: University of Durham (1972); University of Basel (1980); University of Liège (1980); Uppsala College, East Orange, NJ (1982); University of Sussex (1983); Université de la Méditerranée, Aix-Marseille

(1998); St Petersburg State Technical University (1999); Honorary Professor at the University of Hefei, China (1991). Founder: International Journal of Nuclear Instruments and Methods in Physics Research and editor (1957-); International Centre for Physics at the University of Uppsala for Countries under Development (1961); University for Science in Nairobi (1966); Member of the Scientific Advisory Board and cofounder of the World Laboratory.

Summary of scientific research

The main fields of research cover nuclear physics, atomic and molecular physics, electron spectroscopy and surface science. The early part of the production concerned nuclear physics, mainly α- β- and γ-ray spectroscopy of radioactive nuclei. This activity is summarized in the book with the same title. With this background the field of electron spectroscopy for atoms, molecules and condensed matter was developed, beginning during the early fifties. These researches gradually developed in various directions with applications in physics, chemistry and industrial technology, in particular related to surface technology. Photoelectron spectroscopy under the acronym ESCA (Electron Spectroscopy for Chemical Analysis) was described in two books, published in 1967 and 1969 with titles given above. This new spectroscopy can be applied to all states of aggregation of matter and yields detailed information on the atomic and molecular orbitals in chemical compounds in gases, solids or liquids. From a technological point of view, its high surface sensitivity is being utilized in fields like corrosion, surface reactions, catalysis, polymers and solid state electronics. The main emphasis from an instrumental point of view is in particular put on increased spectral resolution and intensity and extension of monochromatic x-ray and UV sources, complemented by synchrotron radiation.

Main publications

Beta- and Gamma-Ray Spectroscopy (1955); *Alpha-, Beta- and Gamma-Ray Spectroscopy* (1965); *Atomic, Molecular and Solid State Structure Studied by Means of Electron Spectroscopy*, ESCA (Uppsala, 1967); *Applied to Free Molecular*, ESCA (Uppsala, 1969); 'Electron Spectroscopy for Chemical Analysis', *Phil. Trans. Roy. Soc. London A*, pp. 33-57 (1970); 'Perspectives and Problems in Electron Spectroscopy', *Proc. Asilomar Conference* (1971), (D.A. Shirley, ed.)(North Holland, 1972); 'Electron Spectroscopy – A New Way of Looking into Matter', *Endeavor*, 32 (1973); 'Electron Spectroscopy for Chemical Analysis', *Proc. of Conf. on Atomic Physics 3*, Boulder (1972), (S.J. Smith and G.K. Walters, eds.)(Plenum, 1973); 'Electron Spectroscopy for Chemical Analysis' (with Allan, C.J.), *MTP Int. Rev. of Science*, vol. 12, Analytical Chemistry, Part 1, Butterworths (1973); 'Electron Spectroscopy – An Outlook', *Proc. Namur Conference 1974* (Elsevier, 1974); 'Electron Spectroscopy and Molecular Structure', *Pure and Appl. Chem.*, 48, (Pergamon, 1976); 'Electron Spectroscopy for Solids, Surfaces, Liquids and Free Molecules', *Molecular Spectroscopy*, Ch. 15 (Heyden, 1977); 'Electron Spectroscopy for Atoms, Molecules and Condensed Matter', *Les Prix Nobel en 1981*, The Nobel Foundation (1982); *Some Current Problems in Electron Spectroscopy* (Plenum, 1983); 'Photoelectron Spectroscopy: Retrospects and Prospects', *UUIP-1136* (April 1985); 'Electron Spectroscopy for

Atoms, Molecules and Condensed Matter – An Overview', *Journ. Electron Spectrosc.*, 36, p. 113 (1985); 'From X-Ray to Electron Spectroscopy and New Trend', *Journ. of Electron Spectroscopy*, 51 (1990); Charged Particle Spectrometer. *Encyclopedia of Physical Science and Technology*, Academic Press 1992 (Also editor of this encyclopedia); High Resolution Electron Spectroscopy, *UPTEC 96* (1996); A Study of High Resolution Valence Electron Spectroscopy by Means of Laser Excitation, *UPTEC 96* (1996); A High Resolution and Large Trasmission Electron Spectrometer, *NIM* (1997); The Medical X-Ray Imaging Project at the ESCA-LASER laboratory, *UPTEC* (1999); Development of Laser Technology Applied to Electronic Structure of Matter in Symbiosis with Electron Spectroscopy, *UPTEC* (2000); Symmetry Analysis of the ZnSe (100)/Air Interface by Second Harmonic Generation, *UPTEC* (March 2000); Hyper-Rayleigh Scattering in Solution of Organic Nonlinear Optical Molecules and Measurement of the Hyperpolarisability, *UPTEC* (March 2000); Dot Pattern from Second Harmonic and Some Sum Frequency Generation in Polycrystallic ZnSe. An extensive monography exists on: 'Electron Spectroscopy and Laser Spectroscopy for Analysis of Solids, Surface, Interfaces and Free Molecules'.