XAFS 15 July 28, 2012 Beijing, China

Outstanding Achievement Award (Edward Stern Prize):

Recommended by the IXAS Awards Committee, approved by the IXAS EC. **The highest award of the International XAFS Society**. The awards committee invites nominations across all disciplinary areas, including both experimental and theoretical studies of XAFS. Nominations should include a curriculum vitae for the nominee.

IXAS Outstanding Achievement Award (Ed Stern Prize)

2012 Awards: Klaus Baberschke (Freie Universität Berlin)
Stephen P. Cramer (University of California & Lawrence Berkeley National Laboratory)

2009 Awards: Britt Hedmann (Stanford University)
Frank de Groot (Utrecht University)

2006 Awards: Calogero R. Natoli (Laboratori Nazionali di Frascati)
John J. Rehr (University of Washington)

2003 Award: Dale Sayers (North Carolina State University)

2000 Award: Ed Stern (University of Washington)

2012 Stern Award of the International X-ray Absorption Society
Prof. Klaus Baberschke

Prof. Klaus Baberschke has been chosen a co-recipient of the 2012 Stern Award due to his exceptional contributions to the field over many years. The Stern Award is the highest honor of the IXAS, and indicates the sum of the contributions of an individual to the field.

Prof. Baberschke has performed pioneering work and the most precise measurements on low Z atoms using near-edge XAFS, EXAFS, surface EXAFS, and magnetism (XMCD), during his group's extensive research on low Z atoms. The importance of his contributions was recognized by his invitations to present plenary talks in numerous of the International XAFS conferences and by many publications in prestigious journals.

Some of the highlights from his group include:

Seminal studies of adsorbed low-Z molecules, e.g. D. Arvanitis, K. Baberschke, L. Wenzel, U. Döbler. *"Experimental Study of the Chemisorbed State of C2H2, C2H4 and C2H6 on Noble-Metal Surfaces*", Phys. Rev. Lett. 57, 3175 (1986). This is the first systematic study of the near-edge x-ray-absorption fine structure for single-layer coverage of C2H2, C2H4, and C2H6 chemisorbed on Cu(100) and Ag(100). This work determined the molecular orientation and bonding strength on the metal surface and allowed a detailed comparison of the near-edge structure to gas phase results.

Sigma-resonance line shape. e.g. D. Arvanitis, H. Rabus, L. Wenzel, K. Baberschke, "*Intramolecular resonances after K-shell excitation of C2H2n adsorbed on Ag and Cu(100) surfaces*", Z. Phys. D 11, 219 (1989). This paper pointed out that quasi-bound state must have an asymmetric line shape, a fact largely ignored at the time by other researchers.

Pi-resonance line shape, e.g. H. Rabus, D. Arvanitis, M. Domke, K. Baberschke, "*High Resolution x-ray absorption spectroscopy of linear hydrocarbons adsorbed on noble metal surfaces*", J. Chem. Phys. 96, 1560 (1992). This pioneering work on high-resolution-NEXAFS was instrumental in showing the non-Lorentzian contribution of vibrations.

EXAFS and Anharmonicity, e.g. L. Wenzel, D. Arvanitis, H. Rabus, T. Lederer, K. Baberschke, G. Comelli, "Enhanced Anharmonicity in the Interaction of Low-Z Adsorbates with Metal Surfaces", Phys. Rev. Lett. 64, 1765 (1990) and 65, 1521 (1990). With this PRL, his group was among the first ones to use the cumulant expansion to determine thermal expansion.

Magnetism and X-ray Magnetic Circular Dichroism (XMCD) The very high sensitivity and flexibility of his apparatus gave his group also advantages in XMCD. XMCD of one (!) monolayer of Ni was possible, e.g. M. Tischer, O. Hjortstam, D. Arvanitis, J. Hunter Dunn, F. May, K. Baberschke, J. Trygg, J.M. Wills, B. Johansson, O. Eriksson, "*Enhancement of orbital magnetism at surfaces: Co on Cu(100)*", Phys. Rev. Lett., **75**, 1602 (1995).

Other important and relevant papers include W.D. Brewer, A. Scherz, C. Sorg, H. Wende, K. Baberschke, P. Bencok, and S. Frota-Pessoa*,"Direct observation of orbital magnetism in cubic solids*", Phys. Rev. Lett. **93**, 077205 (2004), and A. Scherz, E.K.U. Gross, H. Appel, C. Sorg, K. Baberschke, H. Wende, and K. Burke, "*Measuring the kernel of time-dependent density functional theory with X-ray absorption spectroscopy of 3d transition metals",* Phys. Rev. Lett. **95**, 253006 (2005)

Prof. Baberschke's Group has **concentrated** on high quality pioneering case studies and extended the bounds of the field. Prof. Baberschke has been shown to be a very deserving and overdue candidate for the IXAS Edward Stern Outstanding Achievement Award.