



Photo by Friedrich M. Schmidt DGPh

Biography

Edward William Schlag is one of the prominent personalities of physical chemistry and chemical physics of the past decades, both nationally in Germany and internationally. His very broad range of scientific interests and knowledge, his wealth of conventional and unconventional ideas, his never ceasing energy, and last but not least his impressive physical stature have made him one of the leading figures in the field and at uncounted meetings for most of the second half of the twentieth century. This special issue of the Journal of Physical Chemistry is dedicated to him by his friends, colleagues and former students on the occasion of his retirement from active university duty.

The international, in particular binational German–U.S. nature of E. W. Schlag's work and achievements is strongly founded in his personal background and the early part of his vita. He was born on January 12, 1932, in Los Angeles as the son of an American mother and a German father. He spent the major part of his youth in Berlin and Bavaria before he could return to Los Angeles in 1946. In 1949 he took up his studies

of chemistry at the Occidental Colleges in Los Angeles and later joined the research group of B. S. Rabinovich at the University of Washington, Seattle as a graduate student. He was first to apply the newly developed RRKM theory to a practical example and in 1958 graduated with a thesis on "unimolecular isomerization of trans-cyclopropan- d_2 ".

A first year of postdoctoral studies in the group of W. Groth in Bonn allowed him to concentrate on his interest in vacuum UV photochemistry. He quickly realized that progress in the experimental studies could be made only with improved equipment and methods, and he faced this challenge by developing a new vacuum UV light source together with F. J. Comes. This attitude, as well as his ability to contribute successfully to the progress in experimental capabilities, has continuously been a decisive basis of his scientific success.

E. W. Schlag was one of the first to realize the importance of lasers for chemical physics and high-resolution molecular spectroscopy, and his various successful efforts included the first sub-Doppler measurements on polyatomic molecules. These

made full resolution of the spectrum possible, including the rotational degrees of freedom. Molecular jets allowed him to both cool the various internal degrees of freedom in order to simplify complicated spectra and to mass select one species out of a large mixture by the application of multiphoton mass spectrometry and resonance enhanced multiphoton ionization (REMPI). To push the obtainable mass resolution to previously not possible levels, the reflectron time-of-flight mass spectrometer was combined with REMPI. Last but not least, the jet environment allows the formation of van der Waals clusters and the detailed spectroscopy of these fragile species. To investigate nonvolatile moieties, methods of laser evaporation were developed that led to new possibilities in the analysis of large biomolecules.

For deep UV spectroscopy of molecules, Prof. Schlag and co-workers used synchrotron radiation quite successfully, and they showed how to combine this ever improving light source most usefully with some of the methods developed in the much broader field of laser investigations. The more classical deep UV sources were of fixed wavelength, and the spectroscopy of molecular ions had to be performed by analysis of the electron kinetic energy. An important improvement was realized with threshold photoelectron spectroscopy utilizing steradiancy. This idea was later perfected and led to the new zero kinetic energy electron (ZEKE) spectroscopy, with a resolution better by orders of magnitude. The method consequently opened a whole new field, and the success is clearly seen from an entire series of conferences devoted solely to this exciting topic.

All these many experiments could be implemented and utilized for the gathering of new knowledge because E. W. Schlag accepted the offer to move to the TU München in 1971 and build a strong group there. His position of an "Ordinarius" even gave him the opportunity to follow his more theoretical interests in addition to the significant experimental efforts mentioned so far. This part of his research was founded in some of his earliest work and certainly highlighted by joint efforts begun in the U.S. with S. F. Fischer and L. Hofacker that were subsequently continued in Garching. Colleagues who collaborated with him quite extensively over the years are S. H. Lin, P. Hobza, and R. Levine, and the combination of experimental results with theoretical considerations certainly proved quite synergetic.

Beyond the actual scientific work that is well documented in presently about 350 papers in high ranking journals, E. W. Schlag has contributed to the scientific community, the TU München, and the many then young scientists that he educated and collaborated with in many ways. Foremost he created and maintained over decades a highly stimulating and challenging environment at his "Institut für Physikalische Chemie". He introduced new elements into the teaching of physical chemistry at the department and made sure that the students both gained sound basic knowledge of the field and were quickly brought to the frontier of research. Very early, computers were introduced not only in the research laboratories but also in the teaching of all chemistry students.

A most important contribution to the academic life of the department was E. W. Schlag's ability to attract talented young, as well as established, visitors. Over the years about 30 senior Humboldt fellows spent extended periods at the institute and participated in and contributed to the ongoing research. It is a testament to E. W. Schlag's great ability to spot quality and future potential that three of these fellows, R. A. Marcus, F. S. Rowland, and A. H. Zewail, would later be awarded the Nobel

prize. The number of junior visitors and short-term guests must be well beyond 100, and many of these have since matured into established scientists in their home countries, carrying the spirit of the Garching institute into the world.

Due to this large number of guests, E. W. Schlag soon became concerned about the lacking possibilities in Munich, and in large German universities in general, to host and house foreign guests. His persistent efforts, the forging of the necessary alliances, and the pressure he was able to exert eventually led to realization of the International Begegnungszentrum (IBZ or Arnold Sommerfeld Haus) in downtown Munich, close to the main campus of the Ludwig-Maximilians-Universität. This center offers apartments to visitors who stay for periods of many months, as well as a unique setting for small meetings, lectures, and last but not least concerts. The IBZ has been very well received by the university community and has played an important role in the local academic life since its opening in early 1990.

E. W. Schlag played an important and creative role in establishing and developing German-Israeli scientific cooperation. From early on he took part in the MINERVA fellowship program that promoted exchange of scientists between the two countries. In the late 70s, the MINERVA program was willing to consider funding centers, and the Hebrew University applied to establish the Fritz Haber Research Center. It was to be the first such center at the Hebrew University, and there were no precedents. A high ranking German delegation came to Jerusalem to discuss this new joint venture, and E. W. Schlag played a key role in advising the Hebrew University in this matter. The end result was that the Fritz Haber Research Center was able to purchase a better computer than it had applied for, and MINERVA appointed Schlag to be the first Chairman of the scientific advisory committee of the Center. This type of committee is called "Beirat" in German, and the beirat has more teeth than a regular American visiting committee. Schlag has taken this task very seriously and spent much time and effort in promoting the Center and in guiding its scientific development. He also saw to it that several times the endowment of the Center was increased. The Fritz Haber Research Center was localized to the Hebrew University. Schlag's next endeavor was to initiate the James Franck Program, which was meant to be a German-Israeli research initiative in laser-matter interaction. The program started with the Israeli participation of the Hebrew University and of Tel Aviv University, but in time became an all-Israel program. It is now the second largest German-Israeli research initiative and has done much to further encourage experimental work in Israel. Schlag is still a member of the beirat of this program.

E. W. Schlag served, and continues to serve, on the editorial board and as referee for numerous scientific journals. He is often called upon as reviewer for scientific proposals, not only by the Deutsche Forschungsgemeinschaft and other national agencies but also from U.S., Israeli, and international funding bodies. In his roll as reviewer, he does not stop at purely evaluating and reporting but rather is willing to consciously support talented young scientists and new innovative fields of research. Along this line he has played a major role in the initiation, realization, and guidance of various "Schwerpunktprogramme" and "Sonderforschungsbereiche". To bring together scientists of common interest he organized numerous medium-sized meetings, a platform that he found to be most effective and enjoyable. Through his work in the committees of the Alexander von Humboldt Foundation Prof. Schlag was able to attract many

outstanding personalities from the U.S. for visiting professorships at German institutions.

The many achievements of E. W. Schlag are well recognized and honored in the scientific community. Already in 1965 he was named Alfred P. Sloan fellow; since 1978 he has been a full member of the Bavarian academy of Science, and since 1984 a fellow of the American Physical Society. The Hebrew University honored Edward William Schlag in 1988 with the award of a Doctorate honoris causa, and in 1995 the Czech Academy of Sciences awarded him the Golden Heyrovsky Medal of Honor. Also in 1995 he held the J. W. Linnett Professorship for Chemistry at the University of Cambridge and four lectureships of international rank through which he was invited to show the general appreciation for his scientific talks.

On the private side, E. W. Schlag leads a hospitable home—to be correct, more than one—with his wife Angela née countess zu Castell-Castell and their three children. Many guests have learned to appreciate their houses as centers of cultural and intellectual activities and have found them full of music and art. The history of art and of the natural sciences is pursued by E. W. Schlag with the same rigorousness and intensity as the many open questions of chemical and physical nature. For the planning and construction of his houses he acquired profound knowledge in architecture, and one should not be surprised to find very unusual and special ideas implemented.

We all wish him many more years of fruitful and enjoyable research without unnecessary duties and obligations. May the future bring him good health and happiness.

Eberhard Riedle
Jürgen Grotemeyer
George Atkinson