**兴大报告Xing Da Lecture**

**Role of conical intersections in photophysics and photochemistry**

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1975 Ph. D. in Physics, TUM

1976-1979 Research Assistant, Department of Physics, University of Freiburg, Germany

1980-1985 Assistant Professor, Department of Chemistry, University of Heidelberg, Germany

1986-1994 Associate Professor, Department of Chemistry, TUM

1995-1999 Professor, Faculty of Chemistry, University of Düsseldorf, Germany

2000-2013 Professor, Department of Chemistry, TUM

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**Abstract**

Conical intersections play a crucial role in photophysics and photochemistry. At conical intersection seams, the molecular dynamics is dominated by a complete breakdown of the Born-Oppenheimer (BO) approximation. Starting from a historical overview of the BO approximation and the concept of conical intersections, this lecture traces the development of methods which allow the computational study of the ultrafast nonadiabatic dynamics at conical intersections. An overview is also given of computational methods for the simulation of time and frequency resolved nonlinear spectra. It is demonstrated that photochemical dynamics can nowadays be scrutinized in unprecedented detail by the interplay of laser spectroscopy and computational chemistry.

**Selected Publications**

1. W. Domcke and G. Stock, “Theory of ultrafast nonadiabatic excited-state processes and their spectroscopic detection in real time” Adv. Chem. Phys. **100**, 1-169 (1997).

2. W. Domcke, D. R. Yarkony and H. Köppel (Eds.), Conical Intersections: Electronic Structure, Dynamics and Spectroscopy, World Scientific, Singapore, 2004

3. M. F. Gelin, L. Chen and W. Domcke, “Equation of motion methods for the calculation of femtosecond time-resolved 4-wave-mixing and N-wave mixing signals” Chem. Rev. **122**, 17339-17396 (2022).

**Selected Honors and Awards**

Member of the International Academy of Quantum Molecular Science (Menton, France, 2003)

The Copernicus Award (Germany/Poland, 2008)

Honorary PhD, Charles University, Prague, Czech Republic (2012)