



Einladung zum Physikalischen Kolloquium

**Montag, 18.1.2010
16.15 Uhr, H2 (O25)**

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„ Intermolecular Coulombic Decay and Ultrafast energy transfer”

Theoretical investigations are devoted to the question how a system in environment relaxes after having been excited by inner-valence ionization. For water clusters, for instance, electron emission dominates the overall relaxation and takes place on the femtosecond time scale. The occurrence of this newly discovered process in such a relatively low-excitation regime may be surprising, particularly in view of the fact that the isolated excited H_2O^+ can dissipate their excess energy only by vibrational motion and photon emission. Hence, the nature of the electronic decay in environment is intermolecular. A simplified picture for the process which we call ICD emerged. Ionization out of an inner-valence orbital leads to the formation of a hole localized on one of the cluster's monomers. An outer-valence electron of this monomer drops into this hole. Due to an extremely efficient Coulombic mechanism the released energy is transferred to the environment and ejects an electron from it. For the systems we studied, inner-valence ionized monomers without a cluster environment are electronically stable. The ICD has been recently confirmed by beautiful experiments. The underlying process is of a very general nature and its implications reach far beyond clusters and single ionization.