
S E M I N A R **aus** **Halbleiterphysik und Nanotechnologie**

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“Ultrathin MgO(001) layers on Ag(001): A playground for studying adsorption structures and charge transfer phenomena”

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Thin dielectric layers on metals form the basis for many applications such as semiconductor microelectronics, corrosion protection, or data read-out (magnetic tunnel junctions), but are also of interest in fundamental research. On the one hand, they can be used as single-crystalline model surfaces that allow fundamental surface processes on otherwise bulk-insulating materials to be studied with typical electron spectroscopic and microscopic techniques. On the other hand, the formation of the metal/dielectric interface can induce large changes of the workfunction and thus give rise to charge transfer phenomena.

In this talk, I will present adsorption studies on ultrathin (2-4 monolayers thickness) MgO(001) films grown on Ag(001), highlighting both, the regular surface properties of MgO(001) thin films and the unusual properties of this material combination. The two examples discussed are water and pentacene adsorption. In the case of water I will focus on the formation of the 2-dimensional water overlayer on MgO and the interplay between lattice constant and hydrogen bonding in determining the stability of ordered water/hydroxyl structures on the surfaces of alkaline earth metal oxides in general. For pentacene, which is a model organic semiconductor, I will highlight the role of the ultrathin MgO layer in promoting integer charge transfer into the pentacene molecule and how this can be tuned by adjustment of the workfunction of the MgO(001)/Ag(001) substrate.