**Ph.D. Position in Experimental Physics**

*University of Regensburg*

Small molecules can be used as active components in semiconductor devices because the energy gap between filled and unfilled orbitals is similar in magnitude to the bandgap of Si-based semiconductors. To investigate these systems with surface science techniques, sub- to few-monolayers of molecules are deposited on a metal surface. By co-depositing two molecular species, an interface between phases can be studied. There are many outstanding questions with respect to these hard-to-probe molecular interfaces: Are certain sites more or less reactive as a function of their distance to the interface? And how does conductance of charge carriers to the metal electrode change with distance to the interface? In this project, we apply two techniques to address these questions. The first is non-contact lateral force microscopy (LFM), which is a natural candidate for mapping the potential energy map of short-range interactions. Second, we have recently discovered that by simultaneously measuring the tunneling current (STM) and force (AFM) simultaneously, we can measure conductance to the bulk with atomic precision. These two novel techniques go beyond imaging and allow us to quantifiably characterize molecular interfaces. We apply these techniques at low temperature, where we can control the apex of the tip at the atomic level, and at room temperature. This allows us to determine the character of the tip at room temperature and the effect of temperature on local conductivity. Characterization of the conductivity near molecular interfaces will allow us to provide a lower size limit on molecular semiconductor devices and mapping the local potential energy will guide device manufacturing. Moreover, this project will further advance two novel scanning probe techniques.

Interested parties should send a CV, brief cover letter including why this position would appeal to you, and a transcript of recent grades per email to:  

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