

# Fakultät für Physik Universität Regensburg

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Einladung zum

## PHYSIKALISCHEN KOLLOQUIUM Habitationsvortrag

Es spricht: **Dr. Alfred John Weymouth**  
Universität Regensburg

über: „Investigating electrostatics and short-range interactions with atomic force microscopy“

Zeit und Ort: Montag, 10. Oktober 2016  
Hörsaal H 34, 16:00 Uhr

**Abstract:**

It's hard to imagine that we can take a splinter and sharpen it down to the atomic level. It's even more impressive that we can bring this sharp tip close to a surface, scan it over the surface, and be sensitive to the tiny forces between the apex atom and individual atoms on the surface. Measuring and interpreting these forces is the goal of high-resolution atomic force microscopy (AFM). In this presentation, I describe two contributions we have made towards this goal.

To better understand AFM data, it's appealing to take advantage of a related technique and simultaneously measure the tunneling current (i.e. perform simultaneous STM). But with poorly-conducting samples, the tunneling current can directly affect the force. To some, this phantom force is an unwanted phenomenon that prevents simultaneous STM and AFM. To us, it has the potential to locally measure sample resistivity.

In the second half, I present our results with lateral force microscopy. The total force we measure is a combination of short-range forces of interest as well as long-range forces. These long-range forces do not contain atomic contrast and have almost no lateral component. Whereas normal AFM is sensitive to the force component normal to the surface, we changed the geometry of our sensor such that we are only sensitive to lateral forces. This gives us unprecedented sensitivity to short-range interactions. Using this technique, we were able to characterize the bending of a single molecule.