

Stuttgarter Physikalisches Kolloquium

Fachbereich Physik, Universität Stuttgart
Max-Planck-Institut für Festkörperforschung
Max-Planck-Institut für Intelligente Systeme

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Universität Stuttgart, Pfaffenwaldring 57, 70569 Stuttgart-Vaihingen

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Exploring Atomic and Molecular Functionality at Surfaces

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Abstract

The advent of scanning probe microscopy has provided the unique ability to investigate matter with ultimate precision. Single atoms and molecules can be imaged and probed spectroscopically with unprecedented resolution, manipulated to assemble functional nanostructures and excited to induce electronic and chemical change. In the present talk I will present our recent efforts to push the limit of scanning probe microscopy and spectroscopy to the quantum limit by exploiting ultralow temperatures (10mK) as well as by developing novel vacuum interfaces for the controlled handling of nonvolatile compounds and nanostructures. The experiments provide unprecedented microscopic details of single molecule electrostatics, quantum magnetism, and folding. Many new perspectives ranging from quantum critical phenomena through molecular engineering to energy conversion are opened up by these developments.