

Coupling a single ion to a nanomechanical oscillator

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In the present project, we will couple a cold ion in an ion trap to a nanomechanical oscillator consisting of metallic nanowire, thus establishing a new type of quantum interface between a single atom and a solid-state device. We will realize resonant coupling between the two systems mediated by electric fields and will use the nanowire to manipulate the quantum motion of the ion. The project stands right at the interface between quantum science, quantum optics and nanoscience. It is laid out as a collaboration between the Willitsch and Poggio groups in the Departments of Chemistry and Physics, respectively, combining the complementary expertise of both groups in ion trapping and nanoscience in a highly interdisciplinary project. The expected results will open up perspectives for a new research direction, i.e., ion-solid state interfaces, with potential applications in fields as diverse as quantum technology, the nanosciences, mass spectrometry and chemical sensing.