Colloquium

Quantum measurements and simulation with Rydberg atoms

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Host: Johannes Fink

The exploration of the puzzling features of the quantum, like state superpositions, entanglement or measurement processes is a thriving experimental field. It is driven by fascinating applications of the quantum, like quantum metrology, quantum information processing or quantum simulation.Rydberg atoms, long-lived and extremely strongly coupled to external fields, are ideal tools to explore these basic quantum features. We will review a few explorations of the quantum performed at Collège de France using these remarkable states.The strong interaction of circular Rydberg states with microwave fields in high quality superconducting cavities lead to ideal measurements of the photon number, illustrating all postulate of quantum measurement, or to the generation of field states reminiscent of the famous Schrödinger cat. Coherent manipulations in the complex Rydberg manifold lead to the observation of quantum Zeno dynamics and to the realization of ultra-sensitive electric field measurements. Finally, we will present a quantum simulator project emulating spin chains with laser-trapped circular Rydberg atoms.

Monday, December 4, 2017 04:00pm - 05:00pm
Raiffeisen Lecture Hall, Central Building

This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.
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https://ista.ac.at/en/campus/how-to-get-here/ The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.