

**Prize Talk**

PV VIII Tue 16:30 U A-Esch 2

**X-rays go quantum** — ●ADRIANA PÁLFFY — Max-Planck-Institut für Kernphysik, Heidelberg — Laureate of the Hertha-Sponer-Prize

More than fifty years ago, it was the invention of the laser that revolutionized atomic physics and laid the foundations for quantum optics and coherent control. With only optical frequencies available, the interaction of coherent light with matter was for a long time mainly restricted to atomic transitions. Only recently have novel high-frequency light sources rendered x-ray quantum optics possible. In this higher frequency regime, atomic nuclei rise as natural candidates for the interaction with coherent light creating a new bridge between atomic

physics, quantum optics and nuclear condensed matter physics. Nuclei are very clean quantum systems, well isolated from the environment and benefiting from long coherence times.

Combining the advantages of x-rays and nuclei, a prominent incentive is to exploit x-rays as the future quantum information carriers or for novel probing technologies based on quantum effects. Furthermore, the control of nuclear transitions would open the possibility to use long-lived nuclear excited states as a compact and clean energy storage solution. The lecture will follow the developments on the emerging field of x-ray quantum optics and focus on the mutual control of coherent x-ray radiation and nuclear transitions in this new regime of laser-matter interactions.