

Prize Talk

PV III Mon 10:30 Audimax

High resolution laser mass spectrometry in isotope physics applications - balancing selectivity against sensitivity and vice versa — ●KLAUS WENDT — Institut für Physik, Johannes Gutenberg-Universität, D-55099 Mainz — Laureate of the Robert-Wichard-Pohl-Prize 2022

Based entirely on historical atomic physics technologies, as developed by J.J. Thomson and F. Atkins much more than 100 years ago in the Cavendish laboratories and few others, mass spectrometry (MS) has delivered a significant part of our understanding of the nature of matter, specifically allocating individual elements and their isotopes. Since then, numerous MS methods were developed and have revolutionized

investigations in analytics, e.g., in chemistry, biology and medicine. Similarly, our knowledge in fundamental atomic, quantum, nuclear and particle physics has been put forward tremendously by ion manipulation and storage based on MS techniques. On one side MS is severely limited by isobaric interferences caused by the variety of stable and radioactive isotopes of all the elements of the Periodic Table, on the other side, the specific investigation of rare isotopes and the prevention of this effect is of high relevance for a variety of research fields. As will be discussed, the use of resonant laser light for element- and isotope-selective ionization not only opens up new perspectives for MS far beyond routine applications, but represents an independent research tool for precision, atomic and nuclear structure physics, where MS is just used as a background free and sensitive detection unit.