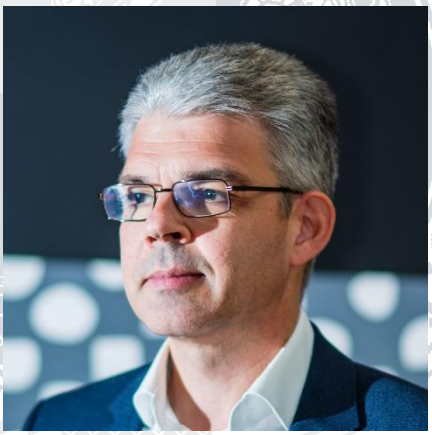
Großes Physikalisches Kolloquium an der Universität zu Köln



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3.06.2025
16^{30} Uhr
HS III

Exploring the heaviest elements at the end of the Periodic Table

Where does the Periodic Table end, and what is the heaviest nucleus that can exist? Is there an "Island of Stability" for superheavy elements? Answering these fundamental questions is central to superheavy element research. These elements do not occur naturally on Earth and can only be synthesized in small quantities using particle accelerators. For over 50 years, research at the GSI in Darmstadt has significantly expanded our understanding of these elusive species, leading to the discovery of six new elements. At GSI, we conduct a comprehensive research program that addresses every aspect of superheavy elements, using a wide range of specialized setups and techniques. Recently, several pioneering experiments have provided crucial insights into the nuclear shell structure of the heaviest nuclei, the reason for their very existence. In addition, atomic properties, such as ionization potentials, have been measured, revealing the influence of relativistic effects. To this end, we have advanced Penning-trap mass spectrometry and laser spectroscopy through innovative approaches.

In my presentation, I will provide an overview of the status of the field and present highlights from recent measurement campaigns.