Plenary Talk PV VII Tue 15:30 U Audimax

Taming Atomic Giants - How Rydberg atoms became veritable quantum simulators — •Matthias Weidemüller — Physikalisches Institut, Universität Heidelberg, Im Neuenheimer Feld 226, 69120 Heidelberg, Germany — University of Science and Technology of China, Shanghai Branch, Shanghai 201315, China

Due to their exaggerated properties, highly excited (Rydberg) atoms have fascinated physicists for more than a century. The study of these atomic giants is intimately connected to major advances in modern quantum science. In the last years, quantum engineering of the atomic interactions on a mesoscopic scale has opened exciting perspectives for using Rydberg atoms to simulate quantum many-body systems, allowing one to address fundamental problems such as, e.g., magnetization relaxation in spin glasses or energy transport in photosynthetic complexes. These advances have promoted ultracold Rydberg atoms to one of the hottest candidates for large-scale quantum simulation. I will provide an introduction into this rapidly growing field of research and present prominent examples of recent achievements.