

# José R. Crespo López-Urrutia

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**Tuesday, 6<sup>th</sup> March 2018, 16:00 s.t.**

TU Wien, Institut für Angewandte Physik, E134  
1040 Wien, Wiedner Hauptstraße 8-10  
Yellow Tower „B“, 5th floor, SEM.R. DB gelb 05 B



## Cold highly charged ions as spectroscopic probes of fundamental interactions

Forbidden optical transitions within the ground state configurations of highly charged ions (HCI) are laser-accessible and extremely impervious to perturbations and systematics that limit optical clock performance. Due to these advantages, they have been proposed for novel optical frequency standards. Moreover, extremely large relativistic, QED, and nuclear size contributions to their wavelengths make them ideal tools for fundamental studies, and several recent proposals call for their use in sensitive searches of a time variation of the fine-structure constant. Since HCI withstand photoionization by vacuum-ultraviolet photons, they could also provide frequency standards for future lasers in that spectral range. We have demonstrated sympathetic cooling by more than seven orders of magnitude down to mK temperatures for HCI with lasers, and are carrying out a variety of experiments exploring these applications.

**José R. Crespo López-Urrutia** studied physics at TU Wien and TU Graz, where he obtained his PhD. He has worked at Max-Planck-Institut für Quantenoptik in Garching and Lawrence Livermore National Laboratory, and obtained his habilitation at the University of Freiburg in Breisgau. In the year 2001 he joined the Max-Planck-Institut für Kernphysik in Heidelberg, and pursues investigations on highly charged ions using electron beam ion traps, radio-frequency traps, lasers, free-electron lasers, and synchrotron radiation. His group has recently developed sympathetic cooling and crystallization of highly charged ions, and is currently searching for transitions with high sensitivity to a possible time-variation of fundamental constants.

All interested colleagues are welcome to this seminar lecture (45 min. presentation followed by discussion)

Friedrich Aumayr  
(LVA-Leiter)

Richard Wilhelm  
(Seminar Chair)