

## Einladung zu einem Kolloquium

Datum/Zeit: **Dienstag, 15.10.2024, 16.45 Uhr**

Referent: **Prof. Johannes Deiglmayr**  
Universität Leipzig, Leipzig, Deutschland

Titel: *Unravelling the structure and dynamics of an exotic molecular system by high-resolution spectroscopy: long-range Rydberg molecules*

Ort: **HCI G7**

Long-range Rydberg molecules (LRMs) are molecules in highly-excited electronic states where the binding results from the scattering of the excited electron from neutral atoms within its orbit and the bond lengths are comparable to the size of the Rydberg electron's orbit. These exotic states exhibit unique properties, including an inverted energy hierarchy, where hyperfine interactions surpass electronic and rovibrational energies, and numerous rovibronic degeneracies, emphasizing the critical role of non-adiabatic couplings. Beyond the fundamental interest in molecular systems with such unusual and exaggerated properties, LRMs are being increasingly explored for applications such as precision measurements of spin-dependent low-energy electron-neutral scattering phase shifts, characterizing density correlations in ultracold gases, and accessing highly excited ion-pair states in molecules.

In this talk I will present an overview of our studies on the properties of LRMs combining high-resolution spectroscopic methods across a broad range from millimeter-wave to mid-infrared and UV frequencies. These studies include the extraction of relativistic low-energy electron-caesium scattering phase shifts from spectroscopic data using a model-potential approach, the exploration of effects of iso-electronic substitution on the binding mechanism, electronic-state tomography of LRMs using microwave photo-dissociation, and the characterization of decay products using mid-IR photo-dissociation ion velocimetry.

**Gäste sind willkommen**