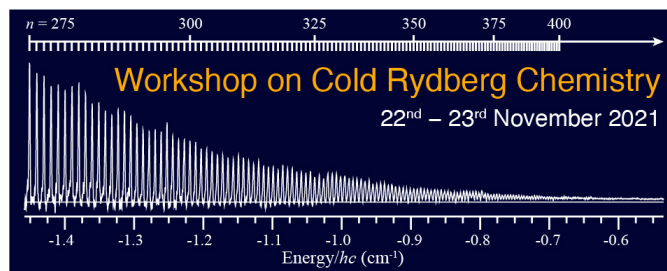


Workshop on Cold Rydberg Chemistry



Contribution ID: 11

Type: **Invited**

Spatial imaging of a novel type of molecular ions

Monday 22 November 2021 20:00 (30 minutes)

Atoms with a highly excited electron, called Rydberg atoms, can form unusual types of molecular bonds. The bond differs from the well known ionic and covalent bonds not only by its binding mechanism, but also by its bond length ranging up to several micrometres. Here, we observe a molecular ion based on the interaction between the ionic charge and a flipping induced dipole of a Rydberg atom with a bond length of several micrometres that was recently proposed by the Raithel and the Hecker-Denschlag group. We measure the vibrational spectrum and spatially resolve the bond length and the angular alignment of the molecule using a high-resolution ion microscope. As a consequence of the large bond length, the molecular dynamics is extremely slow. These results pave the way for future studies of spatio-temporal effects in molecular dynamics, e.g., beyond Born-Oppenheimer physics.

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