OBSERVATION OF COHERENT WAVE PACKETS IN THE H^+H^- ION-PAIR POTENTIAL.

E. REINHOLD, W. HOGERVORST, W. UBACHS, *Laser Centre, Department of Physics and Astronomy, Vrije Universiteit, Amsterdam, Netherlands*.

In an experiment combining 1XUV + 1UV double resonance laser excitation in the presence of a small electric field with pulsed field ionization, bound states in the $1/r$ potential just below the H^+H^- ionization (or dissociation) limit were observed. About 10 cm^{-1}below the limit the level density is so high that even for narrowband excitation ($\Delta\nu_{laser} = 300MHz$) about 150 n-states are coherently excited. Experimentally, signal recurrences were observed as a function of delay of the field ionization pulse, that match the splittings between Stark states. A theoretical interpretation of the phenomena is presented fully based on the analysis of Rydberg states in the hydrogen $atom$, in which the electron is replaced by the heavier H^- particle.