Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Strongly-coupled high-n Rydberg atom pairs[1] SHUHEI YOSHIDA, JOACHIM BURGDÖRFER, Institute for Theoretical Physics, Vienna University of Technology, XINYUE ZHANG, F.B. DUNNING, Department of Physics and Astronomy, Rice University — Creation of pairs of high n, $n \sim 300$, Rydberg atoms with well-defined initial separations enables study and control of their mutual interactions. If the atoms are initially well separated, their interactions are weak and they evolve independently. Their interactions can be dramatically increased, however, by transferring them to even higher levels using carefully-tailored sequences of one, or more, short electric field pulses, the degree of coupling being strongly influenced by the final target state. Since both atoms are subject to the same pulse(s), strongly-correlated macroscopic two-electron wave packets can be created whose subsequent dynamics can be monitored by application of further probe fields. Interest focuses on energy exchange and formation of long lived two-electron-excited states in which, due to their correlated motions, the electrons remain far apart. The production and properties of such states, which lie at the classical-quantum interface, are being explored experimentally and through classical and quantum simulations.

[1]Research supported by the NSF, the Robert A. Welch Foundation, and the FWF (Austria).

Xinyue Zhang
Department of Physics and Astronomy, Rice University

Date submitted: 27 Jan 2015 Electronic form version 1.4