

Abstract Submitted
for the DAMOP07 Meeting of
The American Physical Society

Resonant collision processes in a Cs Rydberg gas¹ K. RICHARD OVERSTREET, ARNE SCHWETTMANN, JONATHAN TALLANT, JAMES P. SHAFFER, The University of Oklahoma — Experimental studies of high principle quantum number Cs Rydberg atom interactions will be described. Ultracold samples of Rydberg atoms provide a unique opportunity to study inelastic collisions where the dynamics are the result of strong multipole interactions. Photoassociative collision resonances that occur in the cold Rydberg gas are a sensitive probe of theoretical pair potential energy curves. We present measurements of the product state recoil energy after photoassociation to identify the collision process taking place in the Cs Rydberg gas. Our results are compared to theoretical pair potential energy curves that account for both dipole and quadrupole long range interactions between Rydberg atoms in a background electric field. The pair nature of the process is confirmed by measurements of the laser intensity dependence and product state charge distribution after pulsed field ionization of the photoassociation collision resonance.

¹We acknowledge funding from the Research Corporation, the OSRHE and the Air Force Office of Scientific Research (FA9550-05-0328).

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Date submitted: 01 Feb 2007

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