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Heavy-Rydberg ion-pair formation in collisions of Rydberg atoms with attaching targets CHANGHAO WANG, MICHAEL KELLEY, F. BARRY DUNNING, Rice University — Collisions between K(np) Rydberg atoms and electron attaching targets can lead to the creation of heavy-Rydberg ion-pair states comprising a weakly-bound positive-negative ion pair orbiting at large internuclear separations. The lifetimes of such states and their correlation with binding energy and the channels available for decay, which can be controlled by varying n, the Rydberg atom velocity, and the target species, are being investigated. The ion-pair states are produced in a small collision cell and allowed to exit to form a beam that passes between a pair of electrodes where their number and binding energy distribution is determined by electric field induced dissociation. Ion-pair production is analyzed with the aid of a Monte Carlo collision code that models both initial Rydberg electron capture and the subsequent evolution of the product ion pair. Research supported by the Robert A Welch Foundation.

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