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Formation of heavy-Rydberg ion pairs in collisions between Rydberg atoms and attaching targets CHANGHAO WANG, MICHAEL KELLEY, F. BARRY DUNNING, Rice University — Electron attachment in collisions between $K(np)$ Rydberg atoms and electron attaching molecules 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 are being examined together with the factors that influence them. These include their binding energies and the available decay channels which can be controlled by varying n , the Rydberg atom velocity, and the target species. The ion pair states are formed in a small collision cell and allowed to exit into an analysis region 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 the 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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