

Abstract Submitted
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Properties of heavy Rydberg ion-pair states formed in collisions between $K(np)$ Rydberg atoms and attaching targets¹ M. CANNON, C.H. WANG, F.B. DUNNING, Rice University — The properties of heavy-Rydberg ion-pair states produced through electron transfer in thermal-energy collisions between $K(np)$ Rydberg atoms and molecules that attach low-energy electrons are investigated. Collisions with targets that undergo non-dissociative attachment create bound ion pairs of the type $K^+ \cdots XY^{-*}$, where XY^{-*} indicates a vibrationally-excited anion. Measurements show that the lifetimes of such ion pairs is limited to a few microseconds by mutual charge transfer, which leads to separation as neutrals, and by dissociation induced by conversion of internal energy in the negative ion into translational energy of the ion pair. Such dissociation is not possible for ion-pair states that involve atomic negative ions such as can be formed through collisions with targets that undergo dissociative attachment. Measurements show the lifetimes of such bound ion pairs are very long.

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