

Abstract Submitted  
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**Observations of ion-pair, heavy Rydberg states above the third dissociation limit of  $\text{H}_2$**  ALEXANDER CHARTRAND, Swarthmore College, ROBERT EKEY, University of Mount Union, ELIZABETH MCCORMACK, Bowdoin College — Resonantly-enhanced multiphoton ionization via the  $EF\ 1\Sigma_g^+$ ,  $v' = 6$  double-well state has been used to probe the energy region from the third dissociation limit through the  $n = 4$  dissociation limit of  $\text{H}_2$ . Ion-pair states with principal quantum number  $n^* = 206 - 318$  are observed indirectly via mixing with the  $n = 3$  continuum. Previous observations of the ion-pair, heavy Rydberg states support a diabatic picture of the avoided crossing of the adiabatic  $B''\bar{B}\ 1\Sigma_u^+$  state with the ion-pair potential at the third dissociation limit. These higher energy observations of ion-pair states allow for a clearer picture of the energy dependence of the quantum defect as the series nears the fourth dissociation limit. We summarize the previous analysis and incorporate these new observations into the overall quantum defect picture.

Alexander Chartrand  
Swarthmore College

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