

Abstract Submitted  
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**Collisional dissociative recombination in helium-hydrogen afterglow plasmas** RAINER JOHNSEN, University of Pittsburgh — The puzzling dependence of electron-ion recombination in helium-hydrogen afterglows on neutral<sup>1</sup> and electron<sup>2</sup> densities is shown to be compatible with the “Collisional Dissociative Recombination” mechanism, originally proposed by Collins,<sup>3</sup> in which three-body capture of electrons into molecular high Rydberg states of  $\text{H}_3^+$  leads to predissociation of the molecular core. While both electrons and neutrals play a role in the three-body capture, their effects on recombination do not add in a simple manner, which makes it difficult to distinguish three-body and binary dissociative recombination. Collision-induced angular momentum mixing ( $l$ -mixing), invoked in earlier models, also occurs but does not provide the rate-limiting step that controls the overall recombination rate.

<sup>1</sup>Glosík et al., Phys. Rev.A **79**, 052707 (2009)

<sup>2</sup>Gougousi et al., Int. J. Mass Spec. Ion Proc. **149-150**, 131 (1995)

<sup>3</sup>Collins, Phys. Rev.A **140**, 1850 (1965)

Rainer Johnsen  
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