Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Hydrogen recombination due to collision with noble gas atoms[1]
STEPHEN PAOLINI, LUKE OHLINGER, ROBERT C. FORREY, Penn State University, Berks Campus — Quantum mechanical calculations are reported for hydrogen recombination in the presence of a chemically inert spectator. The calculations employ a square integrable Sturmian basis set to provide a discrete representation of the H_2 continuum. Direct three-body recombination is approximated by computing transitions from the non-resonant continuum. Resonant and non-resonant states are handled on equal footing within the sequential two-step energy transfer mechanism. Theoretical rate coefficients are computed within the equilibrium and steady-state approximations for the density of intermediate molecules. The results are compared with existing experimental data for He and Ar. The sensitivity of the calculations to pressure variations and to changes in the potential energy surface are investigated for He. The reliability of these calculations and their relevance for astrophysical models is discussed.

[1]This work was supported by NSF Grant No. PHY-0854838.

Robert Forrey
Penn State University

Date submitted: 03 Feb 2011 Electronic form version 1.4