Near Threshold Positron Impact Ionization of Hydrogen

KRISTA JANSEN, S.J. WARD, University of North Texas, J. SHERTZER, College of the Holy Cross, J.H. MACEK, University of Tennessee — The hyperspherical hidden crossing method is used to calculate the ionization cross section for $e^+\cdot H$ near threshold. The Wannier ridge for positron impact ionization corresponds to a co-linear arrangement with the electron between the positron and proton and $r_-/r_+ = .4643$. The adiabatic Hamiltonian for total angular momentum zero is expanded about the saddle point and the analytic adiabatic energies are used to obtain the threshold law for breakup: $\sigma(E) \propto E^{2.64} \exp[-0.49\sqrt{E}]$. Our results are consistent with the previous values of the Wannier exponent$^1$ and the second order correction terms to the threshold law$^2,3$. Using our numerical results for the transition probability in the interaction region, we calculated the absolute $S$–wave ionization cross section.