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Stationary wave-packet continuum-discretization approach to differential ionization in antiproton-hydrogen collisions ILKHOM ABDURAKHMANOV, ALISHER KADYROV, IGOR BRAY, Department of Physics, Astronomy and Medical Radiation Sciences, Curtin University, Australia — A novel single-center close-coupling approach to differential ionization in antiproton-hydrogen collisions has been developed. The continuous spectrum of the target has been discretized using stationary wave packets constructed from the Coulomb wave functions, the eigenstates of the target Hamiltonian. Such continuum discretization allows one to generate pseudostates with arbitrary energies and distribution which is ideal for detailed differential ionization studies. A comprehensive set of benchmark results from integrated to fully differential cross sections for antiproton-impact ionization of hydrogen in a wide energy range is provided. Contrary to previous predictions, we find that at low incident energies the singly differential cross section has a maximum away from zero emission energy. This feature could not be seen without a fine discretization of the low-energy part of the continuum. The ability of the proposed approach to generate target states with arbitrary energies and distribution is ideal for studies of ion-atom collisions where two-center rearrangement processes take place. Studies of those systems in the most detailed fully differential level will shed a light on the issues of double-counting of the continuum associated with the two-center expansion basis.

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