

Abstract Submitted
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Elastic scattering of *o*-Ps by H_2 at low energies J.-Y. ZHANG, M.-S. WU, State Key Laboratory of Magnetic Resonance and Atomic and Molecular Physics, Wuhan Institute of Physics and Mathematics, CAS, Wuhan 430071, China, Y. QIAN, Department of Computer Science and Technology, East China Normal University, Shanghai 200062, China, X. GAO, Beijing Computational Science Research Center, Beijing 100193, China, Y.-J. YANG, Institute of Atomic and Molecular Physics, Jilin University, Changchun 130012, China, K. VARGA, Department of Physics and Astronomy, Vanderbilt University, Nashville, Tennessee 37235, USA, Z.-C. YAN, Department of Physics, University of New Brunswick, Fredericton, New Brunswick, Canada E3B 5A3, U. SCHWINGENSCHLOGL, Division of Physical Science and Engineering, King Abdullah University of Science and Technology (KAUST), Thuwal 23955-6900, Saudi Arabia — We investigate the low-energy scattering of orth-positronium by H_2 from first principles of quantum mechanics using explicitly correlated Gaussians as basis functions. Using the confined variational method, we obtain highly accurate S -wave phase shifts and pick-off annihilation parameters for different incident momenta. With the least-squares fit of these data to the effective-range theory expansions, we determine the S -wave scattering length $A_s = 2.09a_0$ and the zero-energy value of pick-off annihilation parameters ${}^1Z_{eff} = 0.186$. The present value of ${}^1Z_{eff}$ is in good agreement with the experimental values 0.194(4) (PRA **20**, 347 (1979)) and 0.186(1) (JPB **16**, 4065 (1983)). In addition, the present value of S -wave scattering length $2.09a_0$ agrees well with the experimental value $2.1(2)a_0$ estimated with the experimental momentum-transfer cross section (JPB **36**, 4191 (2003)).

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