

Abstract Submitted
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Positronium scattering from hydrogen and helium atoms 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, 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, Thuwal 23955-6900, Saudi Arabia — We investigate the elastic scattering of Ps-H and Ps-He below the Ps($n = 2$) excitation threshold using the confined variational method with explicitly correlated Gaussians as basis functions. As an extension of the previous work (EPL, **99** 43001 (2012)), we calculate phase shifts for the elastic Ps-H scattering for partial waves $1 \leq \ell \leq 3$. We expect that the Ps-H calculation is to determine the contribution of the mixed symmetry terms to phase shifts for partial waves $\ell > 2$ and to resolve the convergence problems that occur in the calculations of Woods et al. for 1^3D with the S-matrix complex Kohn variational method (PRA **92** 022713 (2015)). For the Ps-He scattering below the excitation threshold of Ps($n = 2$), we compute phase shifts, pick-off annihilation rates, and momentum-transfer cross sections for partial waves $\ell \leq 3$ to resolve the huge discrepancies between theory and experiment.

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