Abstract Submitted
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A general numerical method for two-particle scattering in the presence of spin-orbit coupling[1] SU-JU WANG, QINGZE GUAN, D. BLUME, Univ of Oklahoma — The scattering problem in quantum mechanics is usually reduced to solving a set of coupled multi-channel equations in the radial coordinate by expanding the full solution in terms of a complete set of basis functions. When an adiabatic basis set is chosen, a first-derivative term with respect to the radial coordinate appears because of the parametric dependence of the basis functions on the radial coordinate. The symmetrized generalized log-derivative method has been shown to solve this type of problem efficiently [1]. We show that the method can also be applied to the scattering problem in the presence of synthetic spin-orbit coupling, where the first-derivative term originates from the intrinsic coupling between the spin and spatial degrees of freedom, independent of the choice of the basis set. We demonstrate the efficiency of this method for two particles in a wave guide in the presence of spin-orbit coupling. The scattering observables are analyzed in detail and the physical origin behind the rich resonance structure is discussed. [1] F. Mrugala, J. Chem. Phys. 79, 5960 (1983).

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