Abstract Submitted
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Charged Particle Dynamics using the Path Integral Technique[1] A L HARRIS, T A SAXTON, Z TEMPLE, Illinois State University — We present a theoretical and computational technique for calculating time dependent wave functions using the path integral method. Unlike other methods, we calculate the quantum mechanical time evolution operator numerically exactly and use it to time evolve an initial state wave function. To demonstrate the success and accuracy of the method, we present numerical results for simple one-dimensional systems, such as the harmonic oscillator and a particle moving under a constant force. We show that our numerical results agree with the known analytical answers. One of the primary advantages of the path integral method is that it will work better for more massive particles. We test this idea by comparing results for both an electron and a proton, and show that the calculation is much more efficient for heavier particles. This property makes the path integral method ideal for the future study of heavy-ion atomic collisions.

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