

Abstract Submitted  
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**Application of Generalized Hamiltonian Dynamics to Modified Coulomb Potential** JULIAN ANTOLIN CAMARENA<sup>1</sup>, Department of Physics and Astronomy, University of New Mexico, EUGENE OKS<sup>2</sup>, Department of Physics, Auburn University — We apply Dirac's generalized Hamiltonian dynamics (GHD), a purely classical formalism, to spinless particles under the influence of a binomial potential. The integrals of the motion for this potential were chosen as the constraints of GHD, and use Fradkin's unit Runge vector in place of the Laplace-Runge-Lenz vector. A functional form of the unit Runge vector is derived for the binomial potential. It is shown in accordance with Oks and Uzer (2002) that a new kind of time dilation occurs for stable, nonradiating states. The primary result which is derived is that the energy of these classical stable states agrees exactly with the quantal results for the ground state and all states of odd values of the radial and angular harmonic numbers.

<sup>1</sup>This work was for my MS thesis

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