Abstract Submitted
for the TSF06 Meeting of
The American Physical Society

Calculations of Energy Spectra of Quantum Systems Using the Feynman-Kac Path Integral Method JAMES M. REJCEK, NAIL G. FAZLEEV, JOHN L. FRY, Department of Physics, University of Texas, Arlington — A method for calculating the first few energy eigenvalues for quantum systems using the Feynman-Kac path integral is presented. The exact analytical solution of the Feynman-Kac path integral for the finite square well is presented and compared with numerical simulations approximated by random walk simulations on a discrete grid. Using the Laplace transform of the Feynman-Kac path integral and knowing the form of the eigenvalue expansion of the integral, it is possible to calculate the first few energy eigenvalues within an estimated uncertainty. The method provides exact values in the limit of infinitesimal step size and infinite time for the ground state. Improvements of the method have been explored and reasons for the deviations in past reported results are presented.

Nail G. Fazleev
Department of Physics, University of Texas, Arlington

Date submitted: 15 Sep 2006 Electronic form version 1.4