# (3+1)-Dimensional Quantum Mechanics from Monte Carlo Hamiltonian: Harmonic Oscillator

LUO Xiang-Qian,[1,3] XU Hao,[1] YANG Jie-Chao,[2] WANG Yu-Li,[2] CHANG Di,[2] LIN Yin[2] and Helmut Kröger[3]

[1] Department of Physics, Zhongshan University, Guangzhou 510275, China
[2] Guangdong National Communication Network Science & Technology Stock Co., Ltd., Guangzhou 510080, China
[3] Department de Physique, Universite Laval, Quebec, Quebec G1K 7P4, Canada

Abstract: In Lagrangian formulation, it is extremely difficult to compute the excited spectrum and wavefunctions of a quantum theory via Monte Carlo methods. Recently, we developed a Monte Carlo Hamiltonian method for investigating this hard problem and tested the algorithm in quantum-mechanical systems in 1+1 and 2+1 dimensions. In this paper we apply it to the study of the low-energy quantum physics of the (3+1)-dimensional harmonic oscillator.

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