RESONANCE AND REVIVALS II. MORSE OSCILLATOR AND DOUBLE MORSE WELL DYNAMICS

ALVASON ZHENHUA LI, *Microelectronics-Photonics Program, University of Arkansas, Fayetteville, AR 72701*; WILLIAM G. HARTER , *Department of Physics, University of Arkansas, Fayetteville, AR 72701*.

Analytical solutions for the Morse oscillator are applied to investigate the quantum resonance and revivals that occur in position and momentum spaces. The anharmonicity of this oscillator appears to cause interesting space-time phenomena that includes relatively simple Farey-sum revival structure. Furthermore, a simple sum of two Morse oscillators leads to a double Morse well whose geometric symmetry provides a quasi-analytical solution. The resonant beats and revivals of wavepacket propagation involve quantum tunneling between the double Morse wells and mode dynamics local to each well. Such quantum dynamic systems may have applications for quantum information processing and quantum computing.