

Unusual Bound or Localized States

M. A. Cirone^a, G. Metikas^a, and W. P. Schleich^{a,b}

^a Abteilung für Quantenphysik, Universität Ulm, D-89069 Ulm, Germany

^b Department of Physics, North Texas State University, Denton, TX

Reprint requests to Dr. M. A. C. E-mail: m_cirone@virgilio.it

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We summarize unusual bound or localized states in quantum mechanics. Our guide through these intriguing phenomena is the classical physics of the upside-down pendulum, taking advantage of the analogy between the corresponding Newton's equation of motion and the time independent Schrödinger equation. We discuss the zero-energy ground state in a three-dimensional, spatially oscillating, potential. Moreover, we focus on the effect of the attractive quantum anti-centrifugal potential that only occurs in a two-dimensional situation.

Key words: Quantum Mechanics; Bound States; Parametric Oscillator; Periodic Potential.