

MICHIGAN STATE UNIVERSITY
Department of Statistics and Probability

A Workshop on Future Directions in Fractional Calculus Research and Applications

Nick Laskin
Carleton University

Fractional Quantum Mechanics

Abstract

A review of fundamentals and physical applications of fractional quantum mechanics has been presented.

Fundamentals cover fractional Schrodinger equation, quantum Riesz fractional derivative, path integral approach to fractional quantum mechanics, hermiticity of the Hamiltonian operator, parity conservation law, and current density.

Applications of fractional quantum mechanics cover dynamics of a free particle, a new representation for a free particle quantum mechanical kernel, infinite potential well, bound state in δ -potential well, linear potential, fractional Bohr atom and fractional oscillator.

We also review fundamentals of the Levy path integral approach to fractional statistical mechanics.