

# Time-fractional Relativistic Quantum Mechanics

D. Usero

Dept. Análisis Matemático y Matemática Aplicada,  
Fac. CC. Químicas, Universidad Complutense de Madrid, Spain

We explore time-fractional extension of quantum systems. We use the Schrödinger equation of motion and its time-fractional generalization as an starting point for the relativistic case. Then we introduce the time-fractional relativistic Dirac equation. Relativistic solutions for free particles are obtained and some well-known properties such as the Klein paradox and the *Zitterbewegung* of electrons are studied in the framework of time-fractional systems.