World Academy of Science, Engineering and Technology
International Journal of Physical and Mathematical Sciences
Vol:16, No:01, 2022

Using Wavelet Uncertainty Relations in Quantum Mechanics: From Trajectories Foam to Newtonian Determinism

Authors : Paulo Castro, J. R. Croca, M. Gatta, R. Moreira

Abstract : Owing to the development of quantum mechanics, we will contextualize the foundations of the theory on the Fourier analysis framework, thus stating the unavoidable philosophical conclusions drawn by Niels Bohr. We will then introduce an alternative way of describing the undulatory aspects of quantum entities by using gaussian Morlet wavelets. The description has its roots in de Broglie's realistic program for quantum physics. It so happens that using wavelets it is possible to formulate a more general set of uncertainty relations. A set from which it is possible to theoretically describe both ends of the behavioral spectrum in reality: the indeterministic quantum trajectorial foam and the perfectly drawn Newtonian trajectories.

Keywords : philosophy of quantum mechanics, quantum realism, morlet wavelets, uncertainty relations, determinism
Conference Title : ICPP 2022 : International Conference on Philosophy of Physics
Conference Location : London, United Kingdom
Conference Dates : January 21-22, 2022