De Broglie Wave Particle Duality Theory Generalized to Reinterpret the Quantum Linear Superposition Principle

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Abstract

This paper generalizes de Broglie's wave-particle duality theory. According to this generalized model, each physical quantity of a quantum object has certain allowed states, and the quantum object keeps on making periodic oscillations among these allowed states. The quantum linear superposition principle should be interpreted to imply that the quantum object passes through all of its allowed states during the course of its journey in time. The amplitude coefficients of the linear superposition should be interpreted as fractions of times spent by the quantum object in various allowed states. Measured values show randomness because measurements yield results based on their timings and since measurements are timed randomly at the quantum scale. Thus, this paper removes the measurement bias and the over-probabilistic viewpoint of quantum mechanics. The paper then casts and interprets the quantum entanglement phenomenon in terms of synchronous oscillations. Two objects are seen to be quantum entangled because they have similar allowed states and their cycles of oscillations among their allowed states are matching precisely mainly due to their initial conditions. This interpretation does not depict quantum entanglement as a spooky action at a distance, and thereby resolves the EPR paradox. This interpretation can be verified using an experiment similar to quantum entanglement experiments conducted so far. This interpretation has many far-reaching implications. It can have numerous applications in the field of quantum computing. New and better quantum computers can be designed using quantum entanglement due to periodic oscillations.

Keywords: Wave-particle duality; Linear Superposition; Periodic Oscillations; Quantum Entanglement; Synchronous Oscillations