Material Phase Causality or a Dynamics-statistical Interpretation of Quantum Mechanics

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Theoretical and experimental evidences of existence of a causal relation between the phase of the wave function and the dynamics of the quantum system are presented systematically for the first time. Theoretical arguments of spacial and general types are discussed in details. The special arguments arise from the study of the internal phase dynamics of a quantum system subject to interaction with an electromagnetic filed in presence of non-adiabatic factors that include amplitude and phase field time derivatives and dumping from the environment. Exact correspondence between the material phase behavior and the involved physical processes is found. General theoretical arguments for the relation between the phase of the wave function and the physical reality are presented based on the hydrodynamics presentation of quantum mechanics. Experimental evidences of observable dependence of the physical processes from the material phase are also discussed. Summarizing the theoretical and experimental arguments, a new dynamics-statistical interpretation of the quantum mechanics is proposed for the first time. A particle-wave duality picture incorporated in the wave function through its phase and amplitude is considered.

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