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Author: Dr. Igor Gurevich
Institute of Informatics Problems, Russian Academy of Sciences (RAS) / Hetnet Consulting Corp., Russian Federation

ABOUT THE FIFTH TYPE OF FUNDAMENTAL INTERACTIONS

Abstract

There are four types of physical interactions: gravitational, electromagnetic, strong and week. The magnitude of each type of interaction depends on the distance between interacting objects. For example this magnitude for gravitational interaction is equal to the inverse square of the distance between the objects, for the strong interaction it decreases exponentially with the distance, interaction between quarks is proportional to the distance. The type of dependence of interaction magnitude on distance is defined by the corresponding physical law. In the given work is shown that, along with the gravitational, electromagnetic, strong, weak interactions exist fifth type of fundamental interactions-information interaction, whose magnitude is not dependent on distance. The existence of information interaction is determined by the entanglement of quantum states, of quantum subsystems. The magnitude of information interaction is measured in bits. Entangled states, entangled parts of quantum system gives birth to the fifth type of interaction - information interaction. Entanglement is a unique quant mechanical resource which plays key part in a number of most interesting applications of quantum calculations and quantum information. Entanglement is considered a fundamental resource of nature compared in importance to energy, information, entropy or any other fundamental resource. As interaction of entangled states is measured in information units it is natural to consider this interaction to be information interaction. The magnitude of communication between entangled subsystems A and B of quantum system A & B, as well as the connection between two q-bits can be characterized by mutual uncertainty (mutual information entropy). From the law of uncertainty conservation it follows that if a system is at the state ψ, then at changes of coordinates and orientation of q-bits, subsets of q-bits, subsystems, entangled states in general, the uncertainties of entangled states remain. Q-bits contained in the entangled states can be also moved relative to each other with any speed without changing the uncertainty which explains conservation of force (energy) of information interaction. Information interaction of subsystems A and B possesses the following main properties. The information interaction of subsystems is scalar. The magnitude of information interaction of subsystems is not negative. The magnitude of information interaction of subsystems is symmetrical. The magnitude of information interaction of subsystems is not dependent on distance. The magnitude of information interaction of subsystems does not exceed the information volume of subsystems. Decoherence of the entangled states, subsystems is reducing the magnitude of the information interaction.