The effect of entanglement and non-inertial frame on four-qubit quantum game

S Rashidi and H Goudarzi
Department of Physics, Faculty of Science, Urmia University, Iran
Email: h.goudarzi@urmia.ac.ir

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Abstract
The effect of increasing quantum bits and Unruh effect on quantum Prisoners’ dilemma has been investigated for both entangled and unentangled initial states. The Nash equilibrium, as an important result of quantum game theory, was obtained through the different payoffs resulted from choosing various strategies. It has been shown that the non-inertial frame disturbs the symmetry of the game. Actually, selection of the basic quantum strategy by players and calculating the payoff of the game via the density matrix of 4-qubit quantum states can represent a scale of influence of entanglement in a quantum mechanical system.

Keywords: entanglement, Nash equilibrium, non-inertial frame, Pareto optimal, quantum game

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