

Accepted Manuscript

Enhancing non-local correlations in the bipartite partitions of two qubit-system with non-mutual interaction

A.-B.A. Mohamed, A. Joshi, S.S. Hassan

PII: S0003-4916(15)00435-2

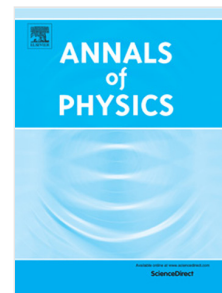
DOI: <http://dx.doi.org/10.1016/j.aop.2015.12.011>

Reference: YAPHY 67024

To appear in: *Annals of Physics*

Received date: 21 April 2015

Accepted date: 30 December 2015



Please cite this article as: A.-B. Mohamed, A. Joshi, S.S. Hassan, Enhancing non-local correlations in the bipartite partitions of two qubit-system with non-mutual interaction, *Annals of Physics* (2016), <http://dx.doi.org/10.1016/j.aop.2015.12.011>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Enhancing non-local correlations in the bipartite partitions of two qubit-system with non-mutual interaction

A.-B. A. Mohamed^{1,2} ‡, A. Joshi³ and S. S. Hassan⁴,

¹ College Of Sciences and Humanities, Prince Sattam Bin Abdulaziz University, Al-Aflaj, Saudi Arabia

² Faculty of Science, Assiut University, Assiut, Egypt

³ Physics Department, Adelphi University Garden City, NY 11530
(mcbamji@gmail.com)

⁴ Department of Mathematics, College of Science, University of Bahrain, 32038, Kingdom of Bahrain (shoukryhassan@hotmail.com)

Abstract. Several quantum-mechanical correlations, notably, quantum entanglement, measurement-induced nonlocality and Bell nonlocality are studied for a two qubit-system having no mutual interaction. Analytical expressions for the measures of these quantum-mechanical correlations of different bipartite partitions of the system are obtained, for initially two entangled qubits and the two photons are in their vacuum states. It is found that the qubits-fields interaction leads to the loss and gain of the initial quantum correlations. The lost initial quantum correlation transfer from the qubits to the cavity fields. It is found that the maximal violation of Bell's inequality is occurring when the quantum correlations of both the logarithmic negativity and measurement-induced nonlocality reach particular values. The maximal violation of Bell's inequality occurs only for certain bipartite partitions of the system. The frequency detuning leads to quick oscillations of the quantum correlations and inhibits their transfer from the qubits to the cavity modes. It is also found that the dynamical behavior of the quantum correlation clearly depends on the qubit distribution angle.

Keywords: Quantum correlation; measurement-induced nonlocality; Bell inequality

1. Introduction

Quantum correlations have some distinct advantages over their classical counter parts, that caused a phenomenal advancements in quantum information processing science and quantum computing in the recent past. These quantum-mechanical correlations

‡ Corresponding author: Abdelbastm@yahoo.com

Download English Version:

<https://daneshyari.com/en/article/1857357>

Download Persian Version:

<https://daneshyari.com/article/1857357>

[Daneshyari.com](https://daneshyari.com)