

Entanglement Engineering of Many Atoms with Nanoresonators

Mahmoud Abdel-Aty

Vice-president of African Academy of Science
Head of Mathematics Department, Zewail City of Science and Technology, Egypt
President of Natural Sciences Publishing USA
Faculty of Science, Sohag University, Egypt
e-mail: amisaty@gmail.com

In this communication we discuss different aspects of information entropy and its application as an indicator of the quantum entanglement. We focus on the dynamics of multi-atom systems coupled to a nanomechanical resonator under influence of both a phonon bath in contact with the resonator and irreversible decay of the qubits. Even in the presence of environment, the inherent entanglement is found to be rather robust. Due to this fact, together with control of system parameters, the system may therefore be especially suited for quantum computer. Our findings also shed light on the evolution of open quantum many-body systems..

Prof. Mahmoud Abdel-Aty

Vice President of African Academy of Sciences
Head of Mathematics Department, Zewail City of Science and Technology, Egypt
President of Natural Sciences Publishing, USA



Prof. Mahmoud Abdel-Aty completed his doctorate in quantum optics at Max-Planck Institute of Quantum Optics, Munch, Germany in 1999. After his analytical study of quantum phenomena in Flensburg University, Germany, 2001-2003, as a post doctorate visitor, he joined the Quantum Information Group at Sohag University in 2004, where he led the quantum optics group. He received the D. Sc. (Doctor of Science), in 2007. Now he is a visiting Professor at Lund University, Sweden and regular associate at ICTP, Italy. He is especially well known for seminal contributions to theories of quantum measurement, nanomechanical modeling, highly non-classical light, practical information security, and optical implementations of quantum information tasks. His current research interests include quantum resources, optical and atomic implementations of quantum information tasks and protocols. He is the Editor-in-Chief of Applied Mathematics & Information Sciences (an International Journal, USA), an editorial board member for several international journals. He has published over 184 papers in international refereed journals, two books and five book chapters. He has awarded several national and international prizes, from France, Italy, Jourdan and Egypt.

www.abdelaty.com