Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Effective Methodology of Quantum Dot Infrared Photodetectors through VisSim MOHAMED EL TOKHY, IMBABY MAHMOUD, Engineering Department, NRC, Atomic Energy Authority, Inshas, Cairo, Egypt, HUSSIEN KONBER — Our goal in this paper is to evaluate the performance of quantum dot infrared photodetectors (QDIPs). The tools that we are used are the VisSim technique along with the block diagram programming procedures. The benefits of using this modeling language are the simplicity of carrying out the performance's measurement through computer simulation instead of setting up a practical procedure which becomes expensive as well as the difficulty of its management. The roles that the parameters of fabrication can play in the characteristics of QDIPs are discussed through developed models implemented by VisSim environment. In order to confirm our models and their validity on the practical applications, we make a comparison between the results obtained by our models and that experimentally published and full agreement is observed. Implicit solution of QDIPs governing by dynamic equations provides exact handling of the device performance. As an example, dark current, photocurrent, responsivity and detectivity is investigated. The implemented models can help designers and scientists to optimize their devices to meet their requirements.

Mohamed El Tokhy
Engineering Department, NRC, Atomic Energy Authority,
Inshas, Cairo, Egypt

Date submitted: 17 Mar 2010 Electronic form version 1.4