International Journal of Electronics and Communication Engineering (IJECE)
ISSN(P): 2278-9901; ISSN(E): 2278-991X
Vol. 3, Issue 1, Jan 2014, 77- 96


International Academy of Science, Engineering and Technology
Connecting Researchers; Nurturing Innovations

# DESIGN OPTIMIZATION OF OPTICAL COMMUNICATION SYSTEMS USING CARBON NANOTUBES (CNTs) BASED ON OPTICAL CODE DIVISION MULTIPLE ACCESS (OCDMA)

**JAFAAR FAHAD A. RIDA[1], A. K. BHARDWAJ[2] & A. K. JAISWAL[3]**

[1,3]Department of Electronics and Communication Engineering, SHIATS -DU, Allahabad, India

[2]Department of Electrical Engineering, SHIATS - DU, Allahabad, India

## ABSTRACT

This paper presents optimized design performance of incoherent OCDMA as well as coherent OCDMA using carbon nanotubes (CNTs) based devices with reference to increased Data Rate (R) and reduced Bit Error Rate (BER) which is far enhanced in comparison to Silicon based Optical Devices. The carbon nanotubes (CNTs) based devices are having optical properties as well as brings in miniatured dimension. Besides, it has been observed that a CNT – based FET switches reliably use less power than silicon based optical devices, specifically in traditional t – gate multiplexer, which is a fundamental logic block, carbon nanotubes based optical devices can have a wide range of applications in a wide variety of miniaturized circuits. The carbon nanotubes with OCDMA system supports ultrahigh speed network with data rate up to Tb/s and exceptional BER performance in the system. The OOK/OCDMA formats provide better performance in comparison to PPM/OCDMA formats because in the OOK formats the numbers of code length is much more than PPM formats, and also less complex hardware from PPM formats. As observed and presented in this paper, the carbon nanotubes brought in the improved performance OCDMA system network with highest data rate and lowest bit error rate.

**KEYWORDS:** OCDMA System, Carbon Nanotubes, OOK Formats, PPM Formats, BER Performance