

# Abstract

**Moustafa Hussein Aly**

## **An efficient SAC-OCDMA system using three different codes with two different detection techniques for maximum allowable users**

In this paper, three codes spectral amplitude coding optical code division multiple access (SAC-OCDMA) are proposed and compared in terms of system performance including bit error rate (BER), number of active users, high achievable data rate, high signal to noise ratio (SNR) and the minimum received power that the OCDMA system supports to achieve a minimum BER value. The proposed codes are diagonal double weight (DDW) codes, modified double weight (MDW) codes and enhanced double weight (EDW). Different detection as and subtraction detection technique and single photodiode detection (SPD) are investigated to reduce the effect of both the multiple access interference and phase induced intensity noise. The obtained results show that SAC-OCDMA using EDW code with SPD detection can achieve large number users with better BER ( $\sim 10^{-9}$ ), SNR ( $> 20$  dB), and minimum received power ( $\sim -20$  dBm) relative to the other codes with other detection techniques.