

## **Triple-play services using Random Diagonal code for spectral amplitude coding OCDMA systems**

In this paper, a new code called Random Diagonal (RD) code for spectral amplitude coding optical code division multiple access (OCDMA) networks is presented. This code is compared with other codes like MQC, MFH and Hadamard which use the same technique. In our work, we utilized this code in one of the OCDMA applications which is called "triple-play" services (audio, video, and data) with different quality-of-service (QoS) requirements; this service is performed by using multiple weights of RD code. The results characterizing the bit-error-rate (BER) with respect to the total number of active users show that RD code offers a significant improved performance over other types of codes. Furthermore, this code can accommodate 20 additional users with smaller code weight at BER of  $10^{-9}$ . In variable weight system, we have shown that using this type of system does not only suppress the Phase Intensity Induced Noise (PUN), but also that RD code with large weight always have the best performance, when other users of different weights are present in the system.