

## **New Design Of Spectral Amplitude Coding In OCDMA With Zero Cross-Correlation**

### **Abstract**

A zero cross-correlation (ZCC) code is proposed to reduce the impact of system impairment and multiple access interference (MAI) in spectral amplitude coding optical code division multiple access (SAC-OCDMA) system. Bit-error-rate (BER) performance is derived taking into account the effect of some noises. The key to an effective OCDMA system is the choice of efficient address codes with good or almost zero correlation properties for encoding the source. The use of ZCC code can eradicate phase induced intensity noise (PIIN) which will contribute to better BER. Thus, we demonstrate, theoretically, the performance of optical ZCC code. It is shown that optical ZCC code can accommodate more users simultaneously for the typical error rate of optical communication system of  $10^{-9}$ . The result indicates that the established system not only preserves the capability of suppressing MAI, but also improves bit-error-rate performance as compared to the conventional coders.

### **Subject Keywords**

Multiple access interference (MAI)  
Optical code division multiple access (OCDMA)  
Optical zero cross-correlation (ZCC) code  
Phase induced intensity noise (PIIN)  
Spectral amplitude coding (SAC)