

# **New approach for evaluation of the performance of spectral amplitude coding-optical code division multiple access system on high-speed data rate**

## **Abstract**

In this study, the authors proposed a new approach to evaluate the system performance of spectral amplitude coding-optical code division multiple access (SAC-OCDMA) systems. The system performance is evaluated based on a new code called the dynamic cyclic shift (DCS) code. The bit-error-rate (BER) performance of the DCS code on high-speed SAC-OCDMA systems has been analysed and reported in this study. The most remarkable trait of the newly developed DCS code is that the cross-correlation is variable between 1 and 0, and the phase induced intensity noise is low. In order to evaluate the performance of the DCS code in high-speed SAC-OCDMA system, the mathematical analysis has been extensively derived along with the simulation analysis at 10 Gbit/s, which is carried out by using 'Optisystem<sup>TM</sup> ver.9 simulation software from Optiwave'. The results obtained for the DCS code were compared with those obtained from different coding schemes [e.g. random diagonal code and modified quadratic congruence code] for the same number of interfering users. It has been observed that the DCS code of BER equal to  $10^{-11}$  can support high data rate (5 Gbit/s) at 60 km transmission link.