

# Random Diagonal Codes For Spectral Amplitude Coding Optical CDMA Systems Using Fiber Bragg-Grating

## Abstract

In this paper we study the use of a new code called Random Diagonal (RD) code for Spectral Amplitude Coding (SAC) optical Code Division Multiple Access (CDMA) networks, using Fiber Bragg-Grating (FBG), FBG consists of a fiber segment whose index of reflection varies periodically along its length. RD code is constructed using code level and data level, one of the important properties of this code is that the cross correlation at data level is always zero, which means that Phase intensity Induced Phase (PIIN) is reduced. We find that the performance of the RD code will be better than Modified Frequency Hopping (MFH) and Hadamard codes. It has been observed through simulation and theoretical results that BER for RD code perform significantly better than other codes. Proof "of-principle simulations of encoding with 3 channels, and 10 Gbps data transmission have been successfully demonstrated together with FBG decoding scheme for canceling the code level from SAC-signal.