An Optical CDMA Random Access Protocol for Multi-rate Optical Networks Adopting Multi-coding Techniques

Amira M. Shata*, Shimaa A. Mohamed*, Ahmed Abdel Nabi**, and Hossam M. H. Shalaby***
*Department of Electrical Engineering, Faculty of Engineering, Alexandria, Egypt.
**Informatics Research Institute, City of Scientific Research and Technological Applications, Alexandria, Egypt.
***Dept. of Electron. and Commun. Eng., Egypt-Japan University of Science and Technology (E-JUST), Alexandria, Egypt

amirashata88@gmail.com, shimaaabdellatif.2011@gmail.com, iplanetfit@yahoo.com, shalaby@ieee.org

***Abstract*— A link layer protocol that supports multi-rate on OCDMA network is proposed based on multi-coding techniques to improve the performance of the network. Our objective is to allow users of different data rates to access the network simultaneously without affecting or reducing the networks performance. Signature sequences are achieved using OCFHC/OOC 2D codes. System throughput and average packet delay are derived for two receiver models, namely, the correlation and chip-level receivers. In our analysis, we only take the effect of multiple access interference (MAI) into account and neglect the effect of receiver noise, as it is relatively minor. The network users are classified into two classes with two different transmission rates. Furthermore, the number of classes is generalized and we are able to show that the overall performance of the network is even better.**

***Keyword*— Multi-coding, multi-rate, one coincidence frequency hop code/optical orthogonal code (2D OCFHC/OOC), optical code division multiple-access (OCDMA), packet delay, throughput.**

Amira M. Shata was born in Alexandria, Egypt, in 1988. He received the B.S. degrees from Alexandria University, Alexandria, Egypt. He

Speaker's Biography:

Ahmed Abdel Nabi is an Associated Professor at City of Scientific Research and Technological Applications, Informatics Institute, Head of Network and Distributed Systems Department, Alexandria Egypt.