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Current challenges and requirements in the design of incoherent optical CDMA detection techniques

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The design of detection techniques represents significant challenges in optical code-division multiple-access (OCDMA) systems. Additional challenges to OCDMA come from critical requirements commonly needed in optical communication systems. These requirements are: very high quality of service (QoS), large capacity, and long distance. Given the interference-limited nature of OCDMA, supporting hundreds of simultaneous users with low bit-error rate (BER) is extremely tough. The code sequences should have the characteristic properties of high autocorrelation peak, which is comparable to the code weight, and low cross-correlation to reduce the amount of interference from other users and acquire low BER. In addition to code sequences, another key issue for suppressing the interference in OCDMA systems is the design of detection technique. Incoherent detection techniques do not need phase synchronization, in contrast to coherent detection approaches, thereby reducing system complexity. Even so, in order to implement an incoherent OCDMA system that performs adequately, a detection technique is required to obviate multiple-access interference (MAI) and phase-induced intensity noise (PIIN) limitations, that must be rejected when decoding the user signal. In this talk, recent progress of developed detection techniques for diminishing both PIIN and MAI influences in incoherent OCDMA systems will be discussed.

Biography

Hamza M. R. Al-Khafaji was born in 1982, originally from Iraq and has been doing research in School of Computer and Communication Engineering at University Malaysia Perlis (UniMAP). He has published many scientific papers and conferences in the field of Optical Communications Engineering. He has working experience as a senior BSS engineer in Huawei Technologies and Omnnea Wireless Telecom, Iraq from 2006 until 2010. Currently, his research interests are in optical CDMA technology, wireless networks, and mobile communications.

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