Abstracts

Optical frequency modulation links: Theory and experiments

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In this paper, the first theoretical analysis and experimental realization of an optical frequency modulation coherent detection (FMCD) link working at microwave frequencies is reported. Advantages over conventional optical intensity modulation direct detection (IMDD) links in terms of reduced effects of fiber nonlinearity, facilitation of multichannel operation, and bandwidth/signal-to-noise ratio (SNR) tradeoffs are identified. A detailed theoretical analysis of the SNR of FMCD links is carried out and compared to that for IMDD links. In the experimental FMCD link, a novel source laser tuning technique, based on the quantum confined Stark effect, is used. The experimental results are presented and compared with the predictions of the theoretical analysis.

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