

# Abstract

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## **Improved Performance of M-ary PPM in Different**

Atmospheric turbulence induced fading is one of the main impairments affecting the operation of free-space optical (FSO) communication systems. In this paper, the bit error rate (BER) of M-ary pulse position modulation (M-ary PPM) of directdetection and avalanche photodiode (APD) based is analyzed. Both log-normal and negative exponential fading channels are evaluated. The investigation discusses how the BER performance is affected by the atmospheric conditions; other parameters such as the forward error correction using Reed Solomon (RS) codes; increasing Modulation level. Results strongly indicate that, RS-coded M-ary PPM are well performing for the FSO links as it reduces the average power required per bit to achieve a BER below  $10^{-9}$  in both turbulence channels.