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All-optical frequency down-conversion based on cross-phase modulation in high nonlinearity dispersion-shifted fiber for WDM radio over fiber application

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Keywords

all-optical frequency down-conversion, radio over fiber (ROF), wavelength division multiplexing (WDM), cross-phase modulation (XPM), modulation instability, high nonlinearity dispersion-shifted fiber (HNL-DSF)

Abstract

Simultaneous all-optical frequency down-conversion technique based on cross-phase modulation in a high nonlinearity dispersion-shifted fiber is proposed and verified by simulation, and its application to a wavelength-division-multiplexing (WDM) radio over fiber (ROF) is proposed. Error-free simultaneous all-optical frequency down-conversion of the 16 WDM ROF upstream channels is achieved. The simulated results show the performance of WDM signals is in good accordance with a single signal without any interference, and the power difference of two beat frequencies of the down-conversion signal is independent of the optical local oscillator power. The wavelength span of larger than 20 nm for down-conversion signal can be obtained.



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