Experimental Investigations of 3-D-/4-D-CAP Modulation With Directly Modulated VCSELs - DTU Orbit (09/12/2018)

In this letter, we present experimental investigations of multidimensional multilevel carrierless amplitude phase (CAP) modulation with directly modulated vertical cavity surface-emitting lasers. The signals are transmitted over 20 km of standard single-mode fiber (SSMF). For multilevel 3-D-CAP, bit rates of 468.75 and 937.5 Mb/s are achieved at two levels/dimension and four levels/dimension, respectively. For 4-D-CAP, bit rates of 416.67 and 833.3 Mb/s are achieved at two levels/dimension and four levels/dimension, respectively. For all signals, a bit-error rate below the forward error correction limit of $2.8 \times 10^{-3}$ for error-free reception is achieved after 20 km of SSMF transmission. Spectral efficiencies of 2.68 and 2.08 b/s/Hz are reported for 3-D-CAP and 4-D-CAP, respectively. We believe that multidimensional modulation formats represent an attractive solution for providing more flexibility for optical fiber systems.

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