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ADVANCED MODULATION FORMATS FOR 40 Gb/s OPTICAL COMMUNICATIONS SYSTEMS

The use of advanced modulation formats has been demonstrated as an effective scheme in managing transmission impairments in long haul high capacity WDM systems. Several studies have been focused on improving the performance of available advanced modulation formats, while we have also explored some new configurations to reduce the required components for multiple channel WDM signal generation with these formats. The urgent studies of such modulation formats at 40Gb/s bit rate is very critical for planning the next generation optical networks, especially when they are transmitted over the current RZ- 10 Gb/s DWDM systems.

This presentation will
(1) Briefly review the schemes for the generation of typical data formats including pulsed multi-channel source generation for return-to-zero (RZ) based WDM application, multi-channel dual-mode based optical pulse source for carrier-suppressed RZ (CSRZ) based WDM application, CSRZ and CSRZ differential phase shift keyed (DPSK) signal generation using Mach-Zehnder modulators and RZ / CSRZ-DPSK generation.
(2) Present the impacts of optical filters (Muxes and Demuxes) of the 10Gb/s DWDM systems over 40 Gb/s channels, especially the filtering characteristics of filter types such as FBGs, thin-film and AWGs.
(3) Consider the dispersion tolerance of modulation formats in linear and nonlinear operating regime and the effects of 40 Gb/s channels on adjacent 10G channels and vice versa.

Recent experimental demonstrations will be illustrated.