

132. Title: Ultra-High Capacity Optical Transmission Technologies for 100 Tbit/s Optical Transport Networks

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Abstract: This paper describes ultra-high capacity wavelength-division multiplexed (WDM) transmission technologies for 100-Tbit/s-class optical transport networks (OTNs). First, we review recent advances in ultra-high capacity transmission technologies focusing on spectrally-efficient multi-level modulation techniques and ultra-wideband optical amplification techniques. Next, we describe an ultra-high capacity WDM transmission experiment, in which high speed polarization-division multiplexed (PDM) 16-ary quadrature amplitude modulation (16-QAM), generated by an optical synthesis technique, in combination with coherent detection based on digital signal processing with pilotless algorithms, realize the high spectral efficiency (SE) of 6.4 b/s/Hz. Furthermore, ultra-wideband hybrid optical amplification utilizing distributed Raman amplification (DRA) and C- and extended L-band erbium-doped fiber amplifiers (EDFAs) is shown to realize 10.8-THz total signal bandwidth. By using these techniques, 69.1-Tbit/s transmission is demonstrated over 240-km of pure silica-core fibers (PSCFs). Furthermore, we describe PDM 64-QAM transmission over 160 km of PSCFs with the SE of 9.0 b/s/Hz.