Transmitters for Spectrally-efficient Transmission at 2000 nm

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The 2000-nm wave band is emerging as a potential new window for optical telecommunications, thanks to several potential advantages over the traditional 1550-nm region. For example, the Hollow-Core Photonic Band Gap Fiber (HC-PBGF) that is an emerging transmission fiber candidate with ultra-low nonlinearity and lowest latency has its minimum loss within the 2000-nm wavelength region. At the same time, the Thulium-doped fiber amplifier that operates in this spectral region provides significantly more bandwidth than the Erbium-doped fiber amplifier. In the presentation, I will report on our recent work in which we demonstrated a single-channel 2000-nm transmitter capable of delivering >52 Gbit/s data signals. To achieve this we employed discrete multi-tone (DMT) modulation via direct current modulation of a Fabry-Perot semiconductor laser. The 4.4-GHz modulation bandwidth of the laser was enhanced by optical injection locking, providing up to 11 GHz modulation bandwidth.