

Short Communication

A Study on Optical Fiber Telecommunications

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The change in worldwide telecommunications traffic from analogue signals to digital signals has lowered the cost of communication services. This requires a more efficient network service in which the conventional copper wires are replaced by fiber optic cables. Light has always been the most important carrier of information. Fiber optic cable is often found in backbone networks because of its wide bandwidth and cost-efficiency. Currently, the optimal data are achieved using silica glass fiber as a transmission medium. Glass fiber contains a high refractive index core, surrounded by a lower refractive index cladding layer. This structure functions as an optical waveguide; light is confined in the fiber core by total internal reflection, allowing the transmission of optical signals over large distances. In the wavelength region of optimum transmission of glass fiber, occurring around 1550 nm, modern fibers exhibit losses as low as 0.2 dB/km. A major issue in optical telecommunication systems is the nonlinear effects in optical fiber related to vibrational excitation modes of silica. These are the stimulated Raman scattering (SRS) and the SBS and they were among the first nonlinear effects studied in optical fibers [1]. The optical fiber serves as a nonlinear, gain-amplifying medium in which the optical field transfers part of the energy to the linear medium from the said stimulated inelastic scattering.

Light sources are an integral part of optical telecommunication systems. Due to the nature of optical telecommunication systems, the design and deployment of light sources for signal generation in an optical telecommunications system is critical. In the case of dense wavelength division multiplexing (DWDM) systems, in which a large number of wavelength sources spaced at 100 GHz, 50 GHz, and more recently, 12.5 GHz, this is an important development in increasing the required carrying capacity of optical telecommunication systems [2].

REFERENCES

- [1] R. V. Johnson and J. H. Marburger, "Relaxation Oscillations in Stimulated Raman and Brillouin Scattering," *Physical Review A*, vol. 4, pp. 1175-1182, 1971.
- [2] Ivan P. Kaminow and Tingye Li, "Optical Fiber Telecommunications IV B: Systems and Impairments," *Academic Press, San Diego*, 2002.