

Seminar

Institute for Plasma Research

Title : Studies on multi-mode Erbium doped fiber amplifiers

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Date : 29th July 2019 (Monday)

Time : 03.30 PM

Venue : Seminar Hall, IPR

Abstract:

The topic of my presentation is “Studies on multi-mode Erbium doped fiber amplifiers”. Few mode Erbium doped fiber amplifier (FMEDFA) is the essential component of space division multiplexing (SDM) based communication system. SDM is a propitious technology to overcome the issue of capacity crunch. The source of capacity crunch is increasing internet traffic which is approaching towards Shannon limit (~100Tbit/s) of single mode fiber. Few mode fiber (FMF) based SDM system is a favourable technology of increasing transmission capacity by increasing the numbers of spatial channels. Each mode (including degeneracy and polarization) of the FMF acts as an information carrying channel due orthogonal nature of modes. In these systems, simultaneous amplification of various signals through a single amplifier instead of using separate amplifiers for each mode is necessary to make the system compact and economical. Therefore, it is necessary to develop SDM compatible FMEDFA. The major challenges in the designing of FMEDFA for SDM system are gain equalization and mode number scaling without mode coupling. During my Ph.D., I have studied various designs like annulus core FMEDFA, trench-assisted annulus core FMEDFA and dual-core FMEDFA for SDM based optical communication systems. The proposed FMEDFAs have been designed for gain equalization of different signal mode groups by tailoring the refractive index profile, erbium doping profile and pumping scheme.

The application of multi-mode EDFA is not limited to SDM systems, it could also be used for high power amplification to overcome the limited power handling capacity of a conventional single mode fiber For high power amplification, I have designed a segmented-core trenchassisted Yb-free EDFA which could selectively amplify the fundamental mode, which is having large mode area.
