

DESIGN AND APPLICATIONS OF ACTIVE FIBRE DEVICES

R.I. Laming and D.N. Payne
Optoelectronics Research Centre, The University, Southampton, UK.
Tel: (+703) 593583 Fax: (+703) 593142

ABSTRACT

Erbium-doped fibre amplifiers are well developed with research aimed at refining their performance. However, incorporation of active fibre in other devices can significantly improve their performance or create new devices.

SUMMARY

Excellent gain performance has been achieved from diode-pumped erbium-doped fibre amplifiers (EDFA) and they are now accepted as a basic building block of future optical fibre communications networks. Nevertheless EDFAs are still being refined in several key areas. These include optimum pump wavelength, fibre design, distributed amplifiers as well as techniques to tailor the gain spectrum. In addition, control aspects such as supervisory and automatic gain control (AGC) as well as the associated components are under investigation.

The availability of efficient, low-noise amplifiers has generated a new class of fibre devices. These range from simple lossless splitters to more complex fibre circuits which can be configured as ultrafast, low-threshold optical switches or to produce mode-locked or single-frequency fibre lasers. High-finesse recirculating delay lines and optical fibre sensors incorporating these amplifiers have also been demonstrated.

Current research in EDFAs will be reviewed and broader applications discussed.