Contribution ID: **373** Type: **Oral Presentation**

Tm-doped double-clad fibre laser development

Friday, 13 July 2012 08:00 (20 minutes)

Abstract content
   (Max 300 words)

New 2 μm Tm-doped fibre lasers have the potential to be used for a variety of applications such as eye-safe lidar systems, remote sensing, directed infrared countermeasures, non-linear wavelength conversion and range finding. In general, fibre lasers are robust sources that offer high average output power with excellent beam quality and efficiency.

Tm-doped fibre lasers are mostly operated at high continuous-wave powers but can also be operated in pulsed mode using a Q-switch for applications that require high peak powers and high repetition rates. However, this requires careful selection of the laser parameters to efficiently operate in either of these modes, considering the laser physics of Tm-doped fibre lasers. Further, the detrimental effects of amplified spontaneous emission, nonlinear effects and optical damage must be minimised through careful laser design.

A major influence on the laser output power and wavelength is the environmental parameters such as atmospheric humidity and temperature. To investigate this a diode-pumped, continuous-wave, Tm-doped, double-clad fibre laser, developed at the Laser Research Institute in Stellenbosch, was characterized at different operational temperatures. The output spectrum was measured with a 2 μm blazed grating spectrometer. The results will be presented, which indicate that without any control mechanism implemented, the wavelength of the Tm-doped fibre laser is temporally unstable.

These preliminary results will be considered for the design and development of a next generation high power pulsed Tm-fibre laser at the National Laser Centre in Pretoria. An overview of the design process and the current status will be presented.

Apply to be
 consider for a student
   award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
   PhD)?

MSc

Main supervisor (name and email)
and his / her institution

Prof. Erich Rohwer, egr@sun.ac.za

Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?

No

Primary author: Mr RIAAN STUART COETZEE, Riaan (Stellenbosch University)

Co-authors: Dr DANIEL ESSER, Daniel (National Laser Center - CSIR); Prof. ERICH G ROHWER, Erich (Laser Research Institute - Stellenbosch); Dr HENCHARL STRAUSS, Hencharl (National Laser Center - CSIR); Dr PIETER H NEETHLING, Pieter (Laser Research Institute - Stellenbosch)

Presenter: Mr RIAAN STUART COETZEE, Riaan (Stellenbosch University)

Session Classification: Photonics

Track Classification: Track C - Photonics