

COMPREHENSIVE LABORATORY BASED EDUCATIONAL PACKAGE IN THE PRINCIPLES OF LASERS



MAIN FEATURES AND BENEFITS:

- Provides all fibre optic hardware required to perform the experimental investigation
- Extensive literature support including: student and instructor's manuals with exercises, solutions & sample results
- Detailed lecture notes, tutorial examples and solutions to assist with the development of courses
- Saves 2-3 years of course, literature and hardware development effort

THE EXPERIMENTAL INVESTIGATION* ADDRESSES:

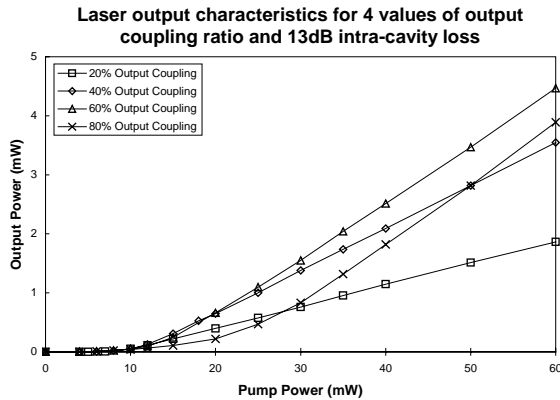
- Construction of a fibre ring laser
- Measurement of lasing threshold
- Laser dynamics: relaxation oscillations, excitation lifetime, laser onset time
- Measurement of slope efficiency
- Effect of intra-cavity loss on the slope efficiency and threshold
- Influence of output coupling ratio on slope efficiency and threshold

* Full details of the experiments and equipment specifications are provided overleaf

Laboratory Exercises

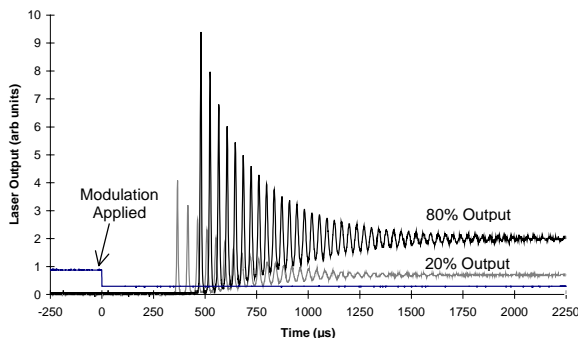
The ED-LASE educator kit enables students to consolidate their knowledge and understanding and to gain practical experience in the investigation of optical amplification and lasers. The experiments include:

- Construction and operation of an EDF ring laser



- Measurement of laser output power and gain as a function of pump power for various levels of intra-cavity loss.
- Measurement of laser output power and gain as a function of pump power for various values of the output coupling ratio.
- Investigation of slope efficiency and threshold as a function of intra-cavity loss.

Relaxation oscillation for two cavity configurations: 80% output (20% feedback) and 20% output (80% feedback) under identical pumping conditions



- Examination of slope efficiency and threshold as a function of output coupling ratio.
- Measurement of relaxation oscillations for different pump powers, levels of intra-cavity loss and coupling ratios
- Investigation of the square of the relaxation oscillation frequency versus pump power in order to derive the excitation lifetime.
- Examination of laser onset time delay as a function of different pump powers, levels of intra cavity loss and output coupling ratios.

Product Description

The Principles of Lasers educator kit enables students to investigate the principles and characteristics of lasers using an Erbium Doped Fibre Ring Laser.

It comprises:

- An erbium doped fibre amplifier
- A set of FC/APC connectorised feedback couplers to alter the output coupling ratio.
- An FC/APC connectorised in-line external variable attenuator to simulate intracavity loss.
- An FC/APC connectorised bandpass filter ($\lambda_c \approx 1550\text{nm}$) to stabilise the laser operating wavelength and to suppress ASE power.
- An InGaAs photoreceiver module (FC/PC receptacle) for output power measurements.
- All of the necessary fibre cable patchcords and adaptors to enable connection between the various units of the system.

In addition, a comprehensive literature package accompanies each kit:

- A set of student laboratory manuals describing the background theory and experimental procedure, with associated exercises to encourage the student to discuss the implications of their results.
- A complete instructor's manual dealing with all aspects of using the equipment and providing sample results for the experiments and exercises.
- Extensive lecture notes on lasers and their applications.
- A comprehensive set of tutorial examples and their solutions.

Additional required equipment:-

- Signal/Function generator capable of a 0 to 5V square wave output of 100-200Hz.
- A two channel laboratory oscilloscope.

Accessories

- Laser safety spectacles with OD3+ at 1550nm are available directly from OPTOSCI.

Ordering Information

ED-LASE Principles of Lasers

SPECS Laser Safety Specs OD3+ 1550nm

Since OPTOSCI are committed to continuously improving the design and performance characteristics of our products, these specifications are subject to change without notice.

Date: 05 October 2004