

## Educator Kit

## ED-LASE

**COMPREHENSIVE LABORATORY BASED EDUCATIONAL PACKAGE ON THE PRINCIPLES & CHARACTERISTICS OF LASERS**



### MAIN FEATURES AND BENEFITS:

- Provides all fibre optic hardware required to perform a detailed experimental investigation of fibre lasers
- 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 significant course, literature and hardware development effort

### THE EXPERIMENTAL INVESTIGATION\* ADDRESSES:

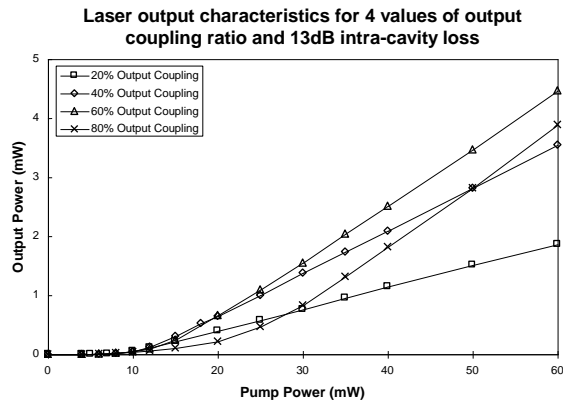
- Construction of a fibre ring laser
- Measurement of lasing threshold
- Laser dynamics: relaxation oscillations, excitation lifetime, laser onset time
- Measurement of slope efficiency
- Effect of intra-cavity loss on the slope efficiency and threshold
- Influence of output coupling ratio on slope efficiency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

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

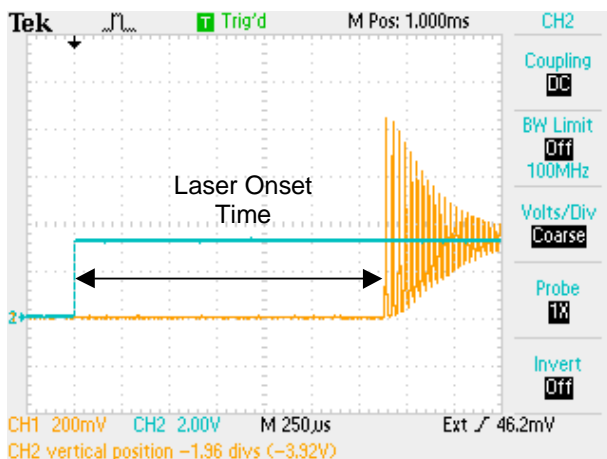
## Laboratory Exercises

The ED-LASE educator kit enables students to construct an erbium doped fibre ring laser and conduct a detailed investigation into its performance, output characteristics and dynamic response. The ED-LASE 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.
- 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 with 25dB small signal gain
- 70mW, 980nm pump laser diode with adjustable drive current, external modulation input and LCD power readout
- A set feedback couplers (20%, 40%, 60% and 80%) to alter the output coupling ratio (i.e. mirror reflectivities).
- An in-line external variable attenuator (0 to 30dB) to simulate intracavity loss.
- A bandpass filter ( $\lambda_c \approx 1550\text{nm}$ ) to stabilise the laser operating wavelength and to suppress ASE power.
- An InGaAs photoreceiver module 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:

- Student laboratory manual, describing the background theory and experimental procedure, with associated exercises to encourage the student to discuss the implications of their results.
- Instructor's manual dealing with all aspects of using the equipment and providing sample results for all the experiments and exercises.
- Extensive lecture notes on laser oscillator characteristics, fibre ring lasers and EDFAs.

*Additional required equipment:-*

- Signal/Function generator: 0-5V square wave output of 10Hz & 100Hz, DC offset capability.
- 2-channel laboratory oscilloscope,  $\geq 20\text{MHz}$  b/w

## 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: March 2018