

OPTICAL DEVICES AND SYSTEMS (ODESY)

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NUMBER OF STUDENTS

- Ph.D : 8
- Master: 9
- Bachelor: 10

RESEARCH KEYWORDS

Optical Communication, Optical Sensors, Amplifiers, Radio over fiber, Optical Interconnect.

OUTLINE OF IKOHZA

Opto-electronics is a basic technology to support a very wide engineering field. Opto-electronics is a key technology in engineering. The ODESY iKohza was founded to establish research activities on opto-electronics such as the optical fiber communication system, the optical fiber amplifiers/lasers, the optical interconnect and the optical sensing system. Odesy IkoHza has strong collaboration with local and international universities such as Tokai University, Keio University and University of Southampton, United Kingdom. The IkoHza supports the Sustainable Development Goals for Industry Innovation and Infrastructure and Sustainable Cities and Communities.

CURRENT RESEARCH

NO.	RESEARCH TOPICS	GRANT NAME
1	Characterization of Europium Aluminium (EU-AL) Polymer Optical Waveguide Amplifier for In-Vehicle Optical Interconnect	FRGS
2	Multiwavelength Semiconductor Optical Amplifier Fiber Laser Based on Parallel Lyot Filter	FRGS
3	Profiling of Volatile Organic Compound (VOC) in Stingless Bee Honey	TDR - UTM
4	Development of Multimode Europium Aluminium Incorporated Polymer Optical Planar Waveguide Amplifier by Using Mosquito Method	TIER 2 - UTM
5	C-Shaped Optical Fiber Sensor for Petrochemical sensing application	GUP - UTM
6	Development of Certification Methodology for Foreign Object Debris Detection System According to EuroCAE Standard	Contract Research DTD
7	Projek 2.4: Ask Dr Solar! 2.0 Pelestarian dan Pemerksaan Aplikasi Dan Amalan Ilmu Kejuruteraan Elektrik Oleh Pelajar Sekolah Rendah Dan Menengah	Community Grant

MERIT OF THE TECHNOLOGY

1. OPTICAL FIBER BRAGG GRATING SENSOR

Fiber Bragg grating (FBG) is the most favourable technology in sensing application due to its inherent advantages such as improved sensitivity, possibility for multiplexing, tiny size, rapid response, and distributed sensing. It has been used in several measurements such as temperature, strain, pressure, as well as refractive index parameters.

2. MICROMACHINING FOR SENSING APPLICATION

A micromachining technique allows for removing a targeted area (Window shaped) of an optical fiber cladding layer via Computer Numerical Control of micro-milling machining technique. A window-shaped structure offers strong mechanical stability to support the sensor due to more remaining cladding and greater evanescent wave exposure compared to other types of optical sensors. In addition, the technique allows for multiple windows fabrication on the same platform which has the potential to manufacture intelligent sensing device.

3. PULSE LASER

Produces light in the form of optical pulses. In contrast to continuous-wave lasers, it has a high average output power and pulse energy, making it unique. The obligations towards parameters affecting the optical pulses provoked, such as pulse duration, pulse energy, pulse repetition rate, and wavelength, vary the pulse generation and types of pulse laser. Q-switched lasers and mode-locked lasers are the most prominent pulse lasers.

4. FIBER LASER SENSOR

With the implementation of a fiber laser as a sensor, the variety of actual peculiarity, as temperature, strain, pressure, etc. are distinguished by the properties of light as it conveys along the fiber laser. The unprecedented dominances of the fiber laser sensor, such as high sensitivity, electromagnetic interference (EMI) immunity, cost-viability, efficiently multiplexing, and high reliability, have piqued interests during recent decades.

5. SEMICONDUCTOR OPTICAL AMPLIFIER

SOA amplifier is the economic, high-performance solution for long-haul WDM networks. SOA optical amplifiers use the semiconductor as the gain medium, which is designed to be used in general applications to increase optical launch power to compensate for the loss of other optical devices. SOA amplifier, due to its features, can be used in Booster and in-line amplification, an optical network, general-purpose test, and measurement and fiber sensing.

POSSIBLE INDUSTRY APPLICATION

- 1 New fault troubleshooting of Assurance Processes for Fiber Access Network in Telekom Malaysia
- 2 Microstructured Optical Fiber Sensor using Micro-milling Machining for Sensing Application
- 3 Foreign Object Debris Detection - Characterisation and Optimisation
- 4 Optical Fiber Bragg Grating Sensor Application
- 5 Optical Interconnect Device



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