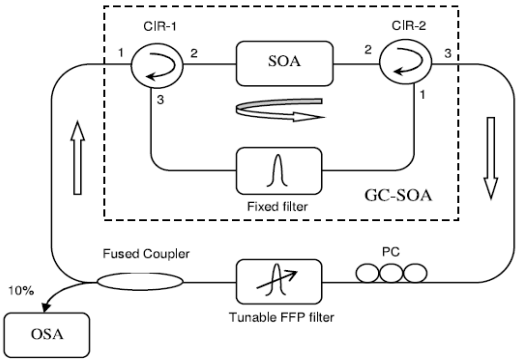
Tunable Fiber Ring Laser

The Invention

- A widely tunable semiconductor fiber ring laser is proposed and demonstrated based on a gain-clamped semiconductor optical amplifier (GC-SOA) working at room temperature



- By incorporating a specially designed GC-SOA as a gain medium, the laser can be tuned from around 1522 nm to almost 1600 nm.
- The laser produces power equalized at the output from 1530 to 1570 nm with a side-mode-suppression ratio (SMSR) of more than 60 dB

Market Need

- Broadly tunable lasers with a good channel spacing and constant power output are always desirable for telecommunication industry and sensor technologies.
- Lasers must meet the International Telecommunication Union (ITU) specification on channel space, switching speeds, stability, noise etc.
  - The Optical component market size for telecommunication was $3.6 billion in 2012 and expected to reach $12.3 billion in 2019
- US Optical Sensor Market expected to be close to $5B and a CAGR of 7.14% over 2014-2020.
- Optical Coherence Tomography is a medical imaging technique which uses tunable lasers.
- Its application are expanding from traditional ophthalmological to skin, dental diagnosis
  - Optical Coherence Tomography system market less mature,close to $1B in 2014 with 12.7% projected CAGR between 2014- 2019

Applications

- Has potential applicability in scenarios where multi-wavelength, switchable, and tunable lasers can be used.
- In wavelength division multiplexing (WDM) telecommunications systems.
- This laser can provide multichannel backup without the need for a second backup laser
- In imaging, gyroscopes, fiber optics sensor, and spectroscopy types of applications.
- Optical Coherence Tomography imaging systems using swept laser sources.

Competitive Advantage

- ✓ **Single Laser** can be tuned **rapidly over mutiple channels** over C & L bands for WDM communications.
- ✓ As opposed to a single discrete light source for each channel is deployed currently **Compact** and **Unique twin-ring architecture**.
- ✓ Made using **off-the-shelf** components.
- ✓ Wide sweep of wavelength with fixed output power

Project Status

- Working prototype of the architecture and laser system has been tested and verified in laboratory conditions.
- Subject technology can be deemed as a technology readiness level of 4.

IP Protection

- US8831047 describes a multiwavelength laser, US9019998 describes a tunable laser setup and US 14/552342 covers a similar architecture to provide a switchable laser source.

For further information please contact:
Email: ip-license@kfupm.edu.sa
Telephone: +966-13-860 8360