1. Introduction

Optical Coherence Tomography (OCT) is proven to be a non-invasive, high resolution (µm), medical optical imaging capable of providing cross-sectional and 3D images to visualize the structure of biological samples and internal organs.²

Swept-source OCT (SS-OCT) requires a laser that is able to sweep over a wide wavelength range as a linear function of time. The axial resolution is defined by wavelength coverage.²

Objective

To develop a tunable swept laser using telecoms laser technology that is able to create a linearly increasing sweep as a function of time, suitable for OCT.

2. Methods

A telecoms laser, with a wavelength coverage of ~60 nm centered at 1540 nm, was optical characterized (lasing wavelength/SMSR) power using the setup shown in Fig. 3.

• 5 section tunable laser allows ‘akinetic’ tunable mechanism
• All-electronically tunable laser without mechanical parts (Vernier tuning)
• Good wavelength coverage

3. Results

- Tuning paths clearly identified
- Mode hopes in the borders
- Wavelength linearly increases
- Wavelength levels are clear
- There are three main regions
- Perform tuning in Region 2
- Outstanding single mode operation
- Useful to increase OCT image quality

4. Conclusion

A linear wavelength sweep can be obtained using a telecoms laser but its performance can be further improved by reducing the noise of the driver electronics and avoiding high noise transitions.

References


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