Swept laser source for optical coherence tomography

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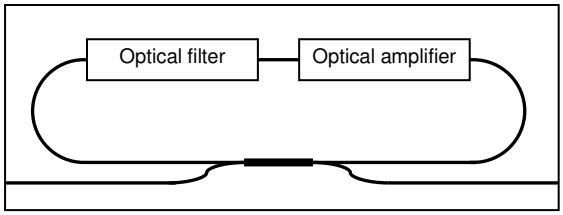
B.W. Tilma, E.A.J.M. Bente, M.K. Smit

COBRA, Eindhoven University of Technology Den Dolech 2,
P.O. Box 513, 5600 MB, Eindhoven, The Netherlands
e-mail: b.w.tilma@tue.nl

In this contribution we give an overview of our work in the IOP Photonic Devices project and the status of it. The project concerns the development of a new integrated laser light source to enable new applications and improve existing applications of optical coherence tomography (OCT). Within the project we are working on a monolithically integrated elektro-optically tunable laser. This laser for OCT imaging requires ideally a tuning range over more than 100nm within the 1600nm to 1800nm range, a scan rate of 20-50 kHz and an output power of 1mW. To achieve this we will design and fabricate a monolithically integrated ring-laser with a tunable intra cavity filter (figure 1). The amplifier generates light (due to spontaneous emission) in the 1600nm to 1800nm range which will be amplified every roundtrip when it passes the optical amplifier. By inserting a filter in this ring-laser structure all unwanted modes will be suppressed ending up with a single laser mode. Tuning the filter changes the mode that will dominate in the laser and so the wavelength of the laser. A small part of the light in the ring will be coupled out to use for OCT.



***Figuur 1**:Ring-laser structure with amplifier section and intra cavity filter.*

Currently we are working on the realization of the tunable filter. Figure 2 shows the mask layout of a number of tunable filters and test-structures. Specific aspects of the tuning control and design issues relating to the technological limitations will also be presented.

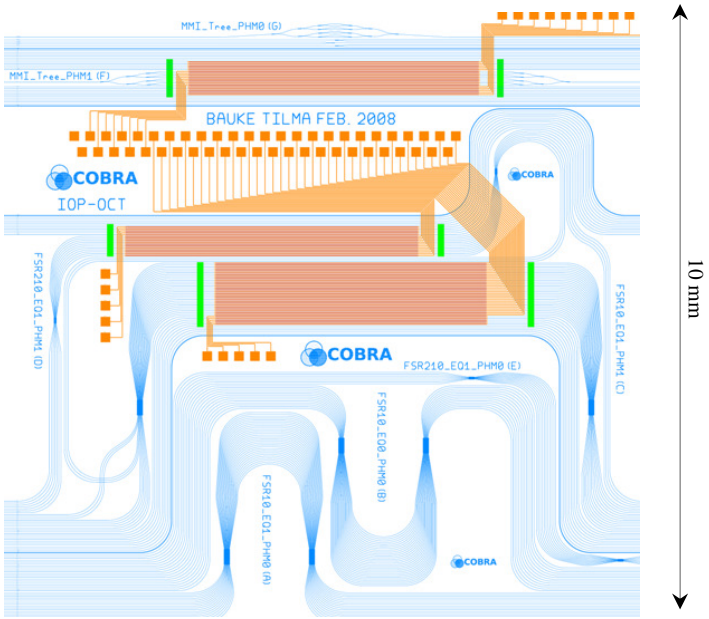


***Figure 2:** Mask layout of the tunable filter and some test-structures. The tunable filter can be controlled by the electrical contact pads.*