

Swept laser source for optical coherence tomography

Citation for published version (APA):

Tilma, B. W., Bente, E. A. J. M., & Smit, M. K. (2008). Swept laser source for optical coherence tomography. In *Proceedings Photonica Evenement 2008*

Document status and date:

Published: 01/01/2008

Document Version:

Publisher's PDF, also known as Version of Record (includes final page, issue and volume numbers)

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.tue.nl/taverne

Take down policy

If you believe that this document breaches copyright please contact us at:

openaccess@tue.nl

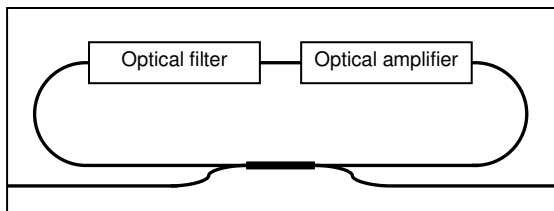
providing details and we will investigate your claim.

Swept laser source for optical coherence tomography

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



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

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.

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.

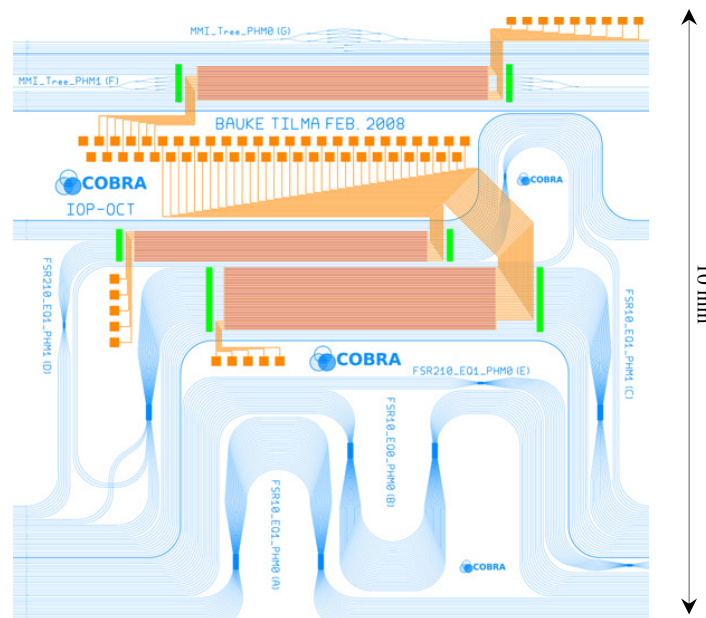


Figure 2: Mask layout of the tunable filter and some test-structures. The tunable filter can be controlled by the electrical contact pads.