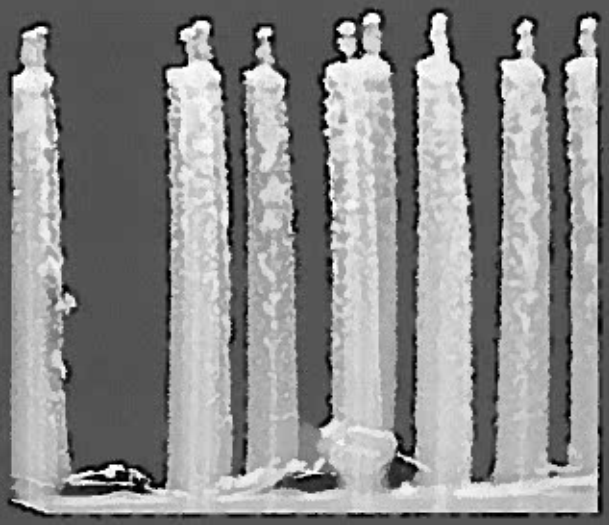
JKU
JOHANNES KEPLER
UNIVERSITY LINZ

Nanoforum 2014



23.-24.06.2014

Programme

Nanoforum 2014

Monday June 23

13:00	Welcome	
13:20	x-ray scattering	Rainer T. Lechner MU Leoben (invited)
13:40		
14:00		Christian Röthel TU Graz
14:20		Raphael Grifone JKU Linz / ESRF
14:40		Tanja Etzelstorfer JKU Linz
15:00	Coffee	
15:20		
15:40	nanoXals & nanowires	Marc Walter ETH Zurich (invited)
16:00		
16:20		Julian Treu TU Munich
16:40	opto-electro-nics I	Thomas Müller TU Vienna (invited)
17:00		
17:20		
17:40		
18:00	Dinner	
18:20		
18:40		
19:00		
19:20		

Tuesday June 24

09:00		
09:20	optoelec-tronics II	Christoph Deutsch TU Vienna
09:40		Benedikt Schwarz TU Vienna
10:00		Magdalena Schatzl JKU Linz
10:20		Florian Hackl JKU Linz
10:40	Coffee	
11:00		
11:20	nano-structures	Stefano Tebi JKU Linz
11:40		Ruxanda A. Barb JKU Linz
12:00		Ebrahim Ghanbari JKU Linz
12:20		Raphael A. Hobbiger JKU Linz
12:40	Lunch	
13:00		
13:20		
13:40		
14:00	quantum dots	Ana Predojevic U Innsbruck (invited)
14:20		
14:40		Alexander Bechtold TU Munich
15:00		Johannes Wildmann JKU Linz
15:20		Christian Großauer JKU Linz
15:40	Coffee & Closing	
16:00		

Plasmonics and quantum cascade structures for on-chip sensing

B. Schwarz[1], P. Reininger, D. Ristanić, H. Detz, A. M. Andrews,
W. Schrenk and G. Strasser
Institute for Solid State Electronics and Center for Micro- and Nanostructures, Vienna University of Technology, Vienna, Austria

Mid-infrared spectroscopy is one of the main techniques to investigate the composition of chemicals substances via their unique pattern of absorption lines. To access remote areas, where conventional laboratory equipment is not available or possible, one has to develop more compact and cost-effective sensing systems. Here, we present a monolithically integrated sensor by integrating a laser, a plasmonic waveguide and a detector on the same chip [1].

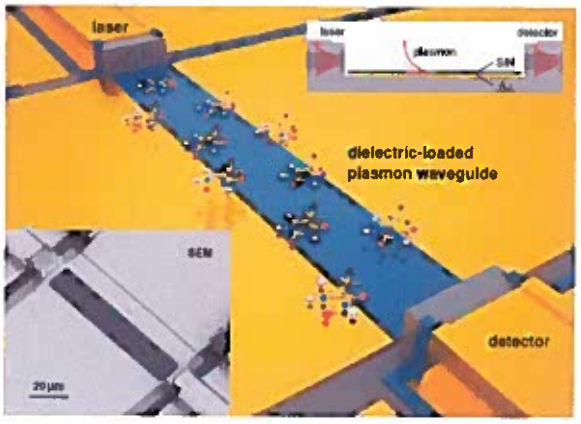


Figure 1: Sketch and SEM image of the monolithic device, comprising a laser, a SPP waveguide and a detector, taken from [1].

Both the laser and the detector are fabricated from a bi-functional quantum cascade structure, which provides optical gain when biased and acts as a detector at zero bias. The interaction region is realized with a 50 µm long dielectric loaded surface plasmon polariton (DL-SPP) waveguide. Owning to the evanescent nature of SPPs the mode is mainly located outside, which enhances the interaction with a surrounding chemical substance. In the prototype experiment using a mixture of ethanol and water we achieved a limit of detector of 0.06 %, which can be further increased with a few tricks.

[1] B. Schwarz et al. Nature Communications **5**, 4085 (2014).

[1] benedikt.schwarz@tuwien.ac.at