

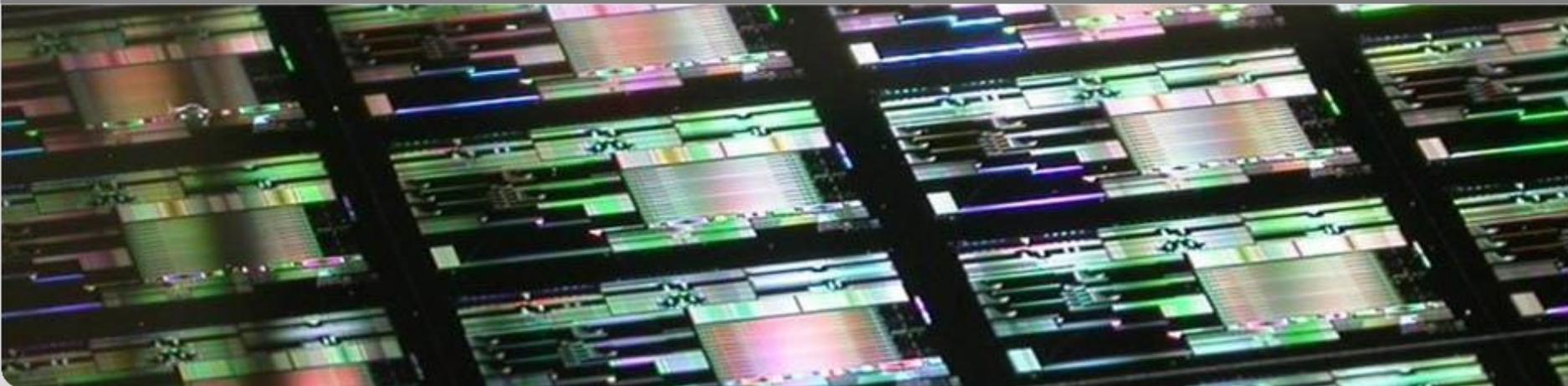
# NAVOLCHI TelConf. 02.12.2013

## Surface Plasmon Polariton Absoprtion Modulator (SPPAM)

Institute of Photonics and Quantum Electronics (IPQ), Karlsruhe, Germany

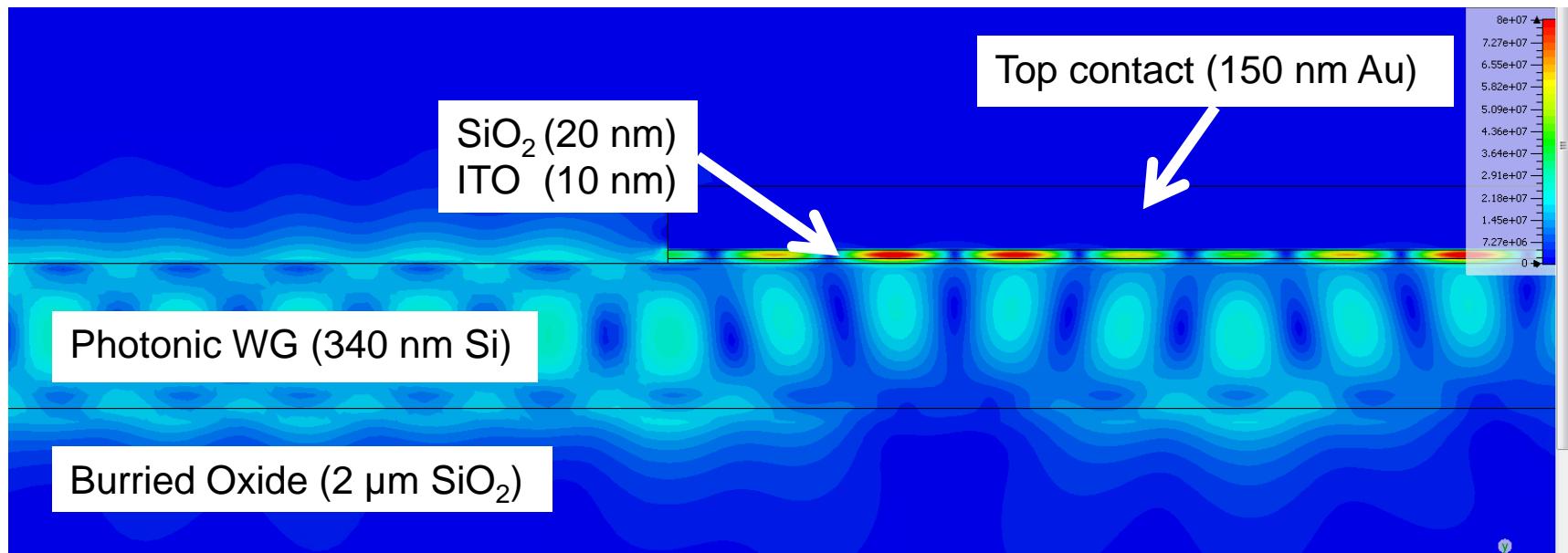
Institute of Microstructural Technology, Karlsruhe, Germany

Institute of Electromagnetic Fields (IFH), ETH Zurich, Switzerland



# Design

Electric Field (CST simulations), here no voltage applied

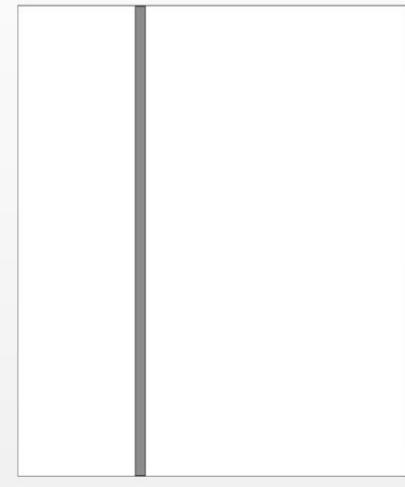


Working principle: carrier density of ITO may be switched by applying an electric field → absorption of ITO modulated

# Fabrication Process

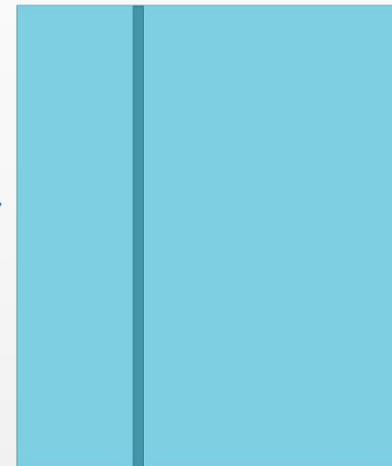
## Structuring of passives

E-Beam Lithography and ICP etching of 340 nm Si



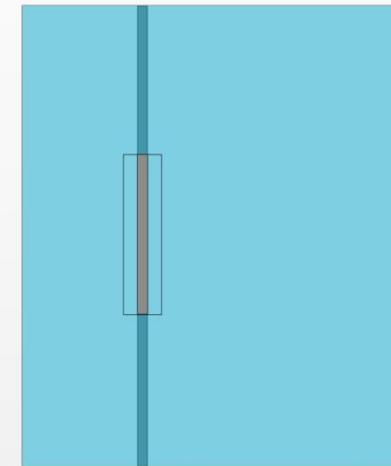
## Cladding deposition

PECVD of 500 nm SiO<sub>2</sub>

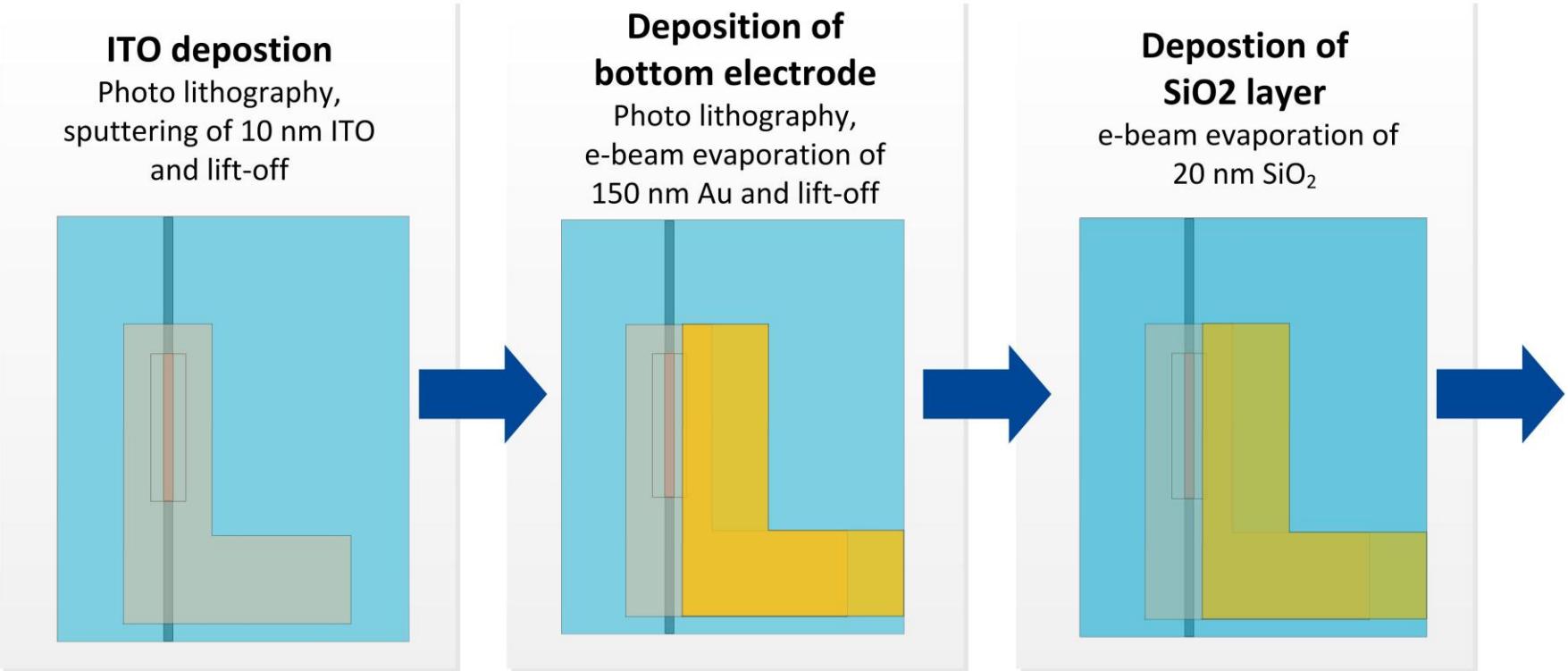


## Structuring of SiO<sub>2</sub> openings

Photo lithography and RIE etching



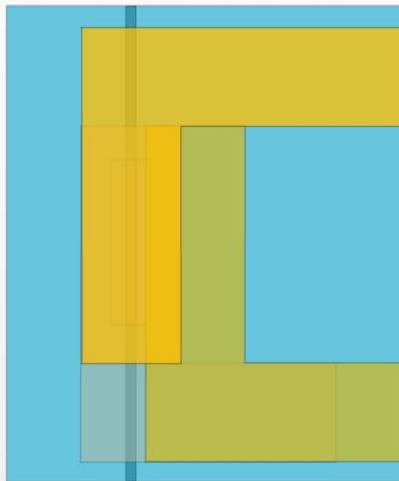
# Fabrication Process



# Fabrication Process

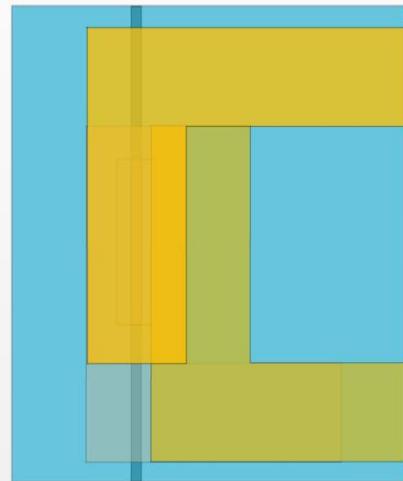
## Deposition of top electrode

Photo lithography,  
e-beam evaporation of  
150 nm Au and lift-off

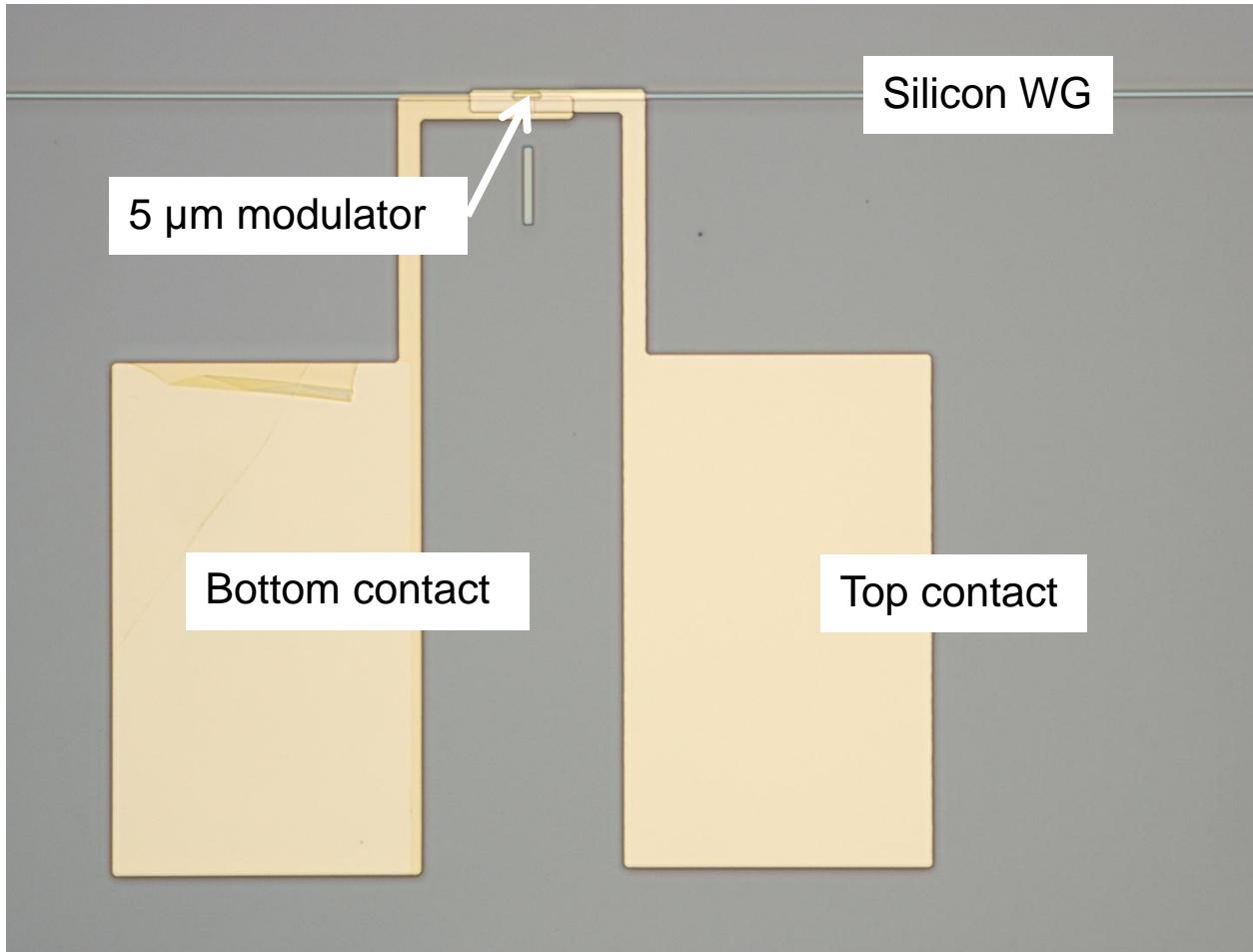


## Opening of SiO<sub>2</sub>

Photo lithography and  
RIE etching

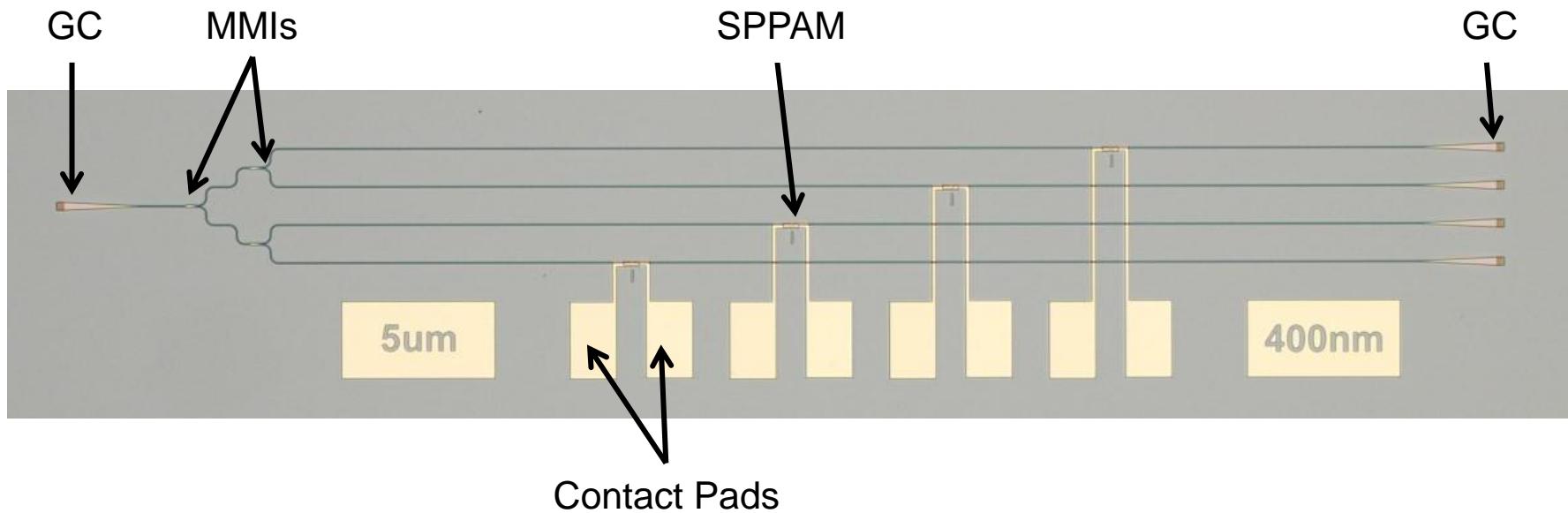


# Optical Microscope Image Single Device



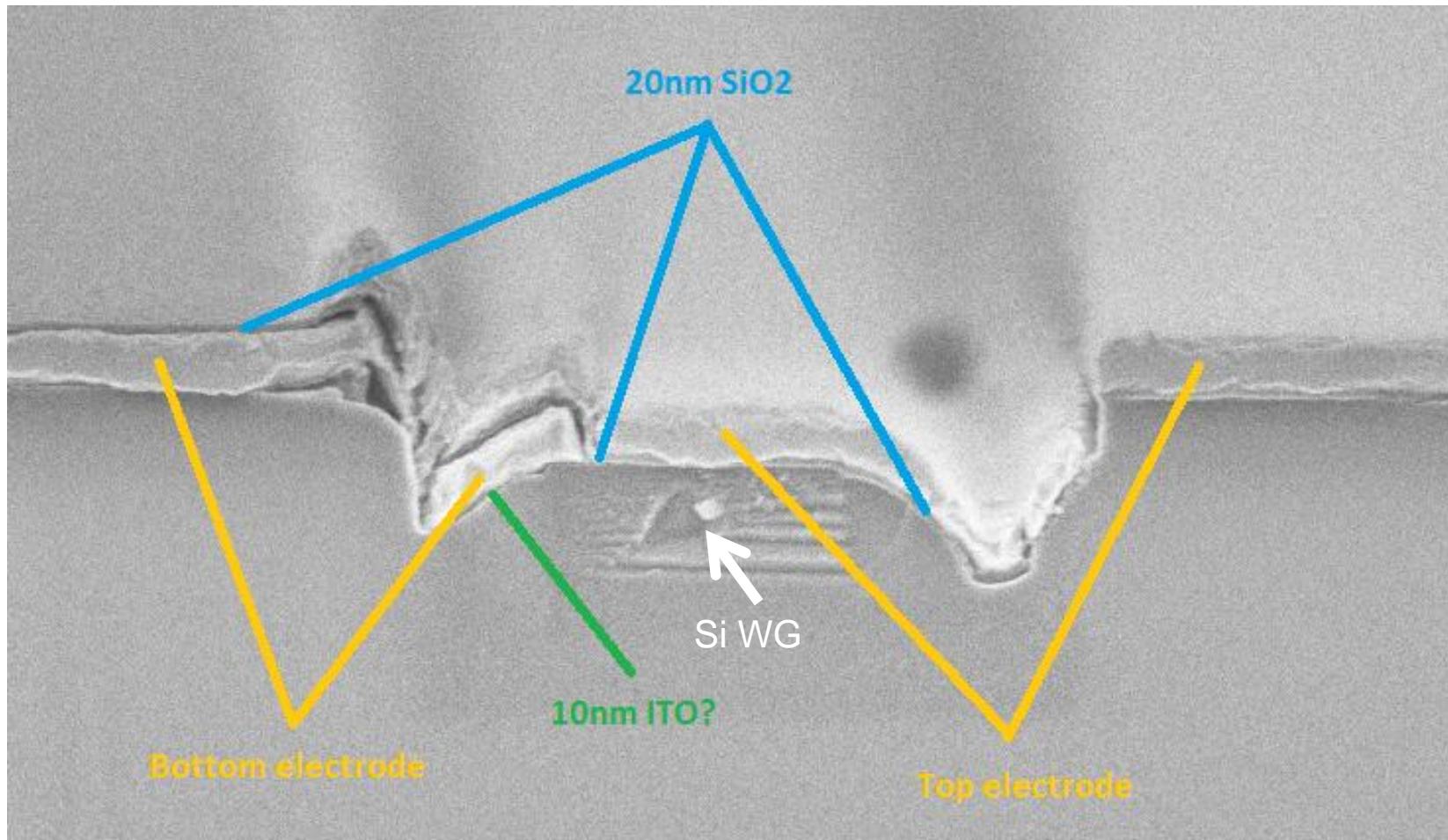
# Optical Microscope Image

## Four Channel Array (50 $\mu\text{m}$ pitch)

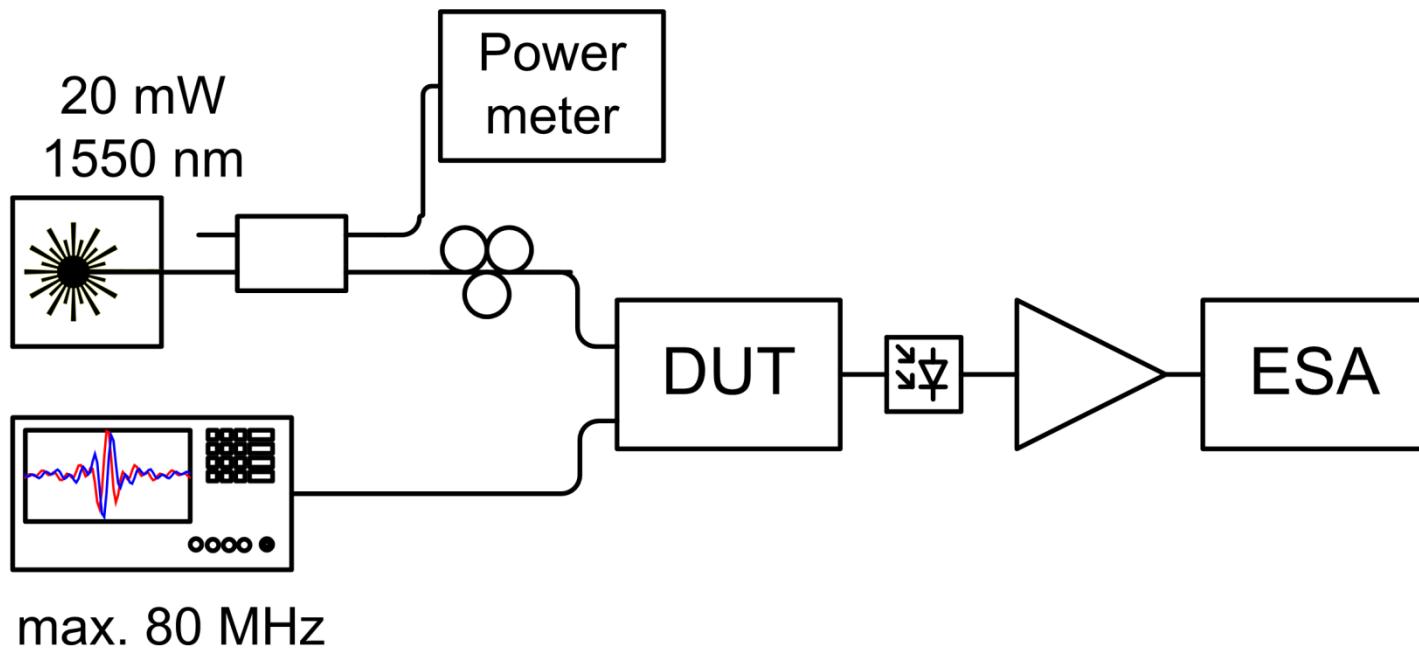


- Arrays of 2 and 4 channels with pitches of 35  $\mu\text{m}$ , 50  $\mu\text{m}$ , 250  $\mu\text{m}$
- 3, 5, 10, 20  $\mu\text{m}$  long devices

# SEM Image Cross Section



# Characterization (in progress)



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10µm long device, sin ±1 V, 80 MHz

