



**Point-One**

Pole of innovative technology on nanoelectronics and embedded systems

**MEMS**Land

*Cost Effective MEMS to Develop a Sustainable High Tech Business*

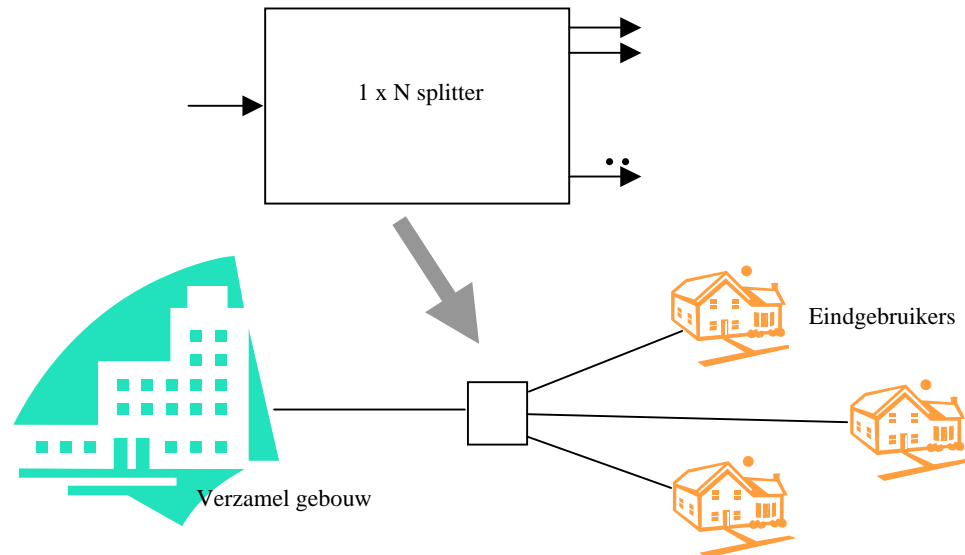
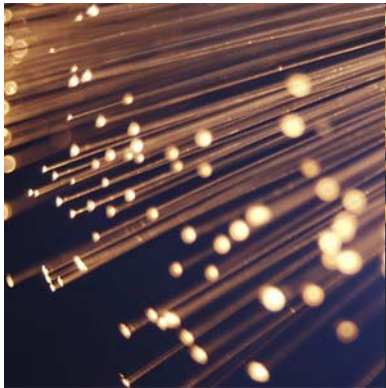
# BC7: 1\*32 Planar Optical Splitter



**Douwe Geuzebroek**

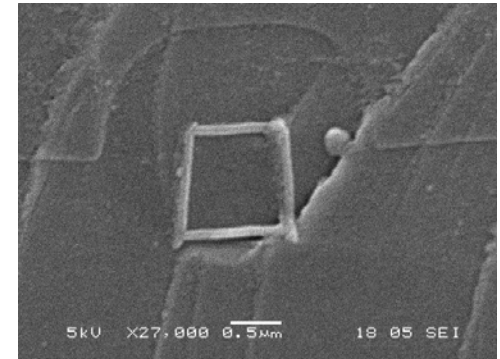
## 1\*32 Planar optical splitter

- The 1\*32 planar optical splitter splits an incoming light signal into 32 output signals.
- Enabler for the Fiber-to-the-Home implementations of Broadband connections to the end user premises.
- Planar waveguide technology replaces bulky fiber based products
- Planar waveguide technology is platform for integration of complex devices, where routing of optical signals can be done.



## Splitter technology

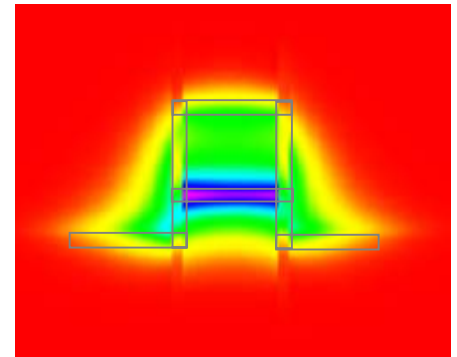
- Specification of technology
  - 1\*32 splitter will be build out of five stages of 1\*2 splitter
  - Based on low loss and polarization independent waveguide technology
  - The fiber to waveguide coupling must be accurately controlled



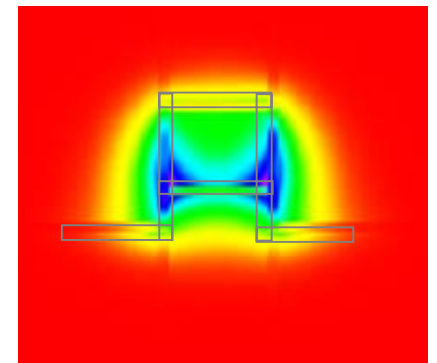
## WP3

- Optimization of waveguide technology
  - Improvements of lithography
  - Etching optimization
- Performance in good accordance with predicted values
  - functional modeling and design support (PhoeniX)
  - For cross-section and mask design

$$|E_x|^2$$

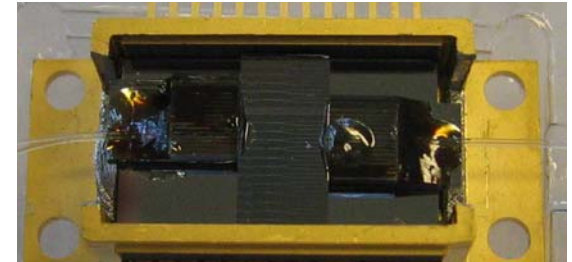


$$|E_y|^2$$



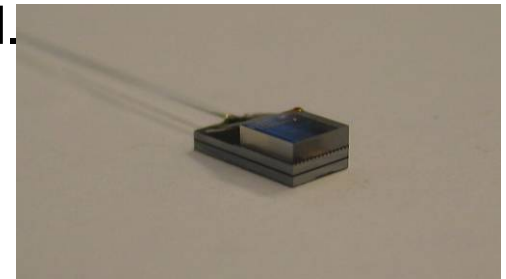
## WP3

- Assembly technology
  - The connection of the multiple optical fibers to the optical chip is under investigation. Partner; MA3
  - A mass producible package that allows for the fiber-to-chip coupling to be placed and protected. Partner; Boschman -> Package with optical fiber in and outputs
  - A standard package has been developed for lower index contrast devices



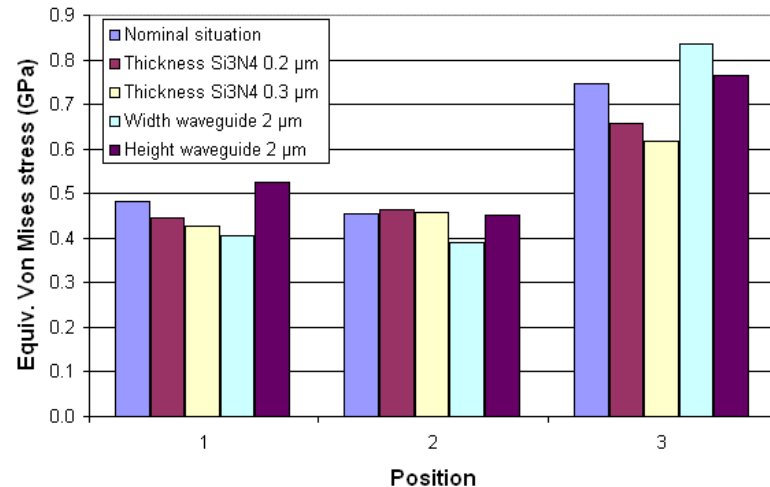
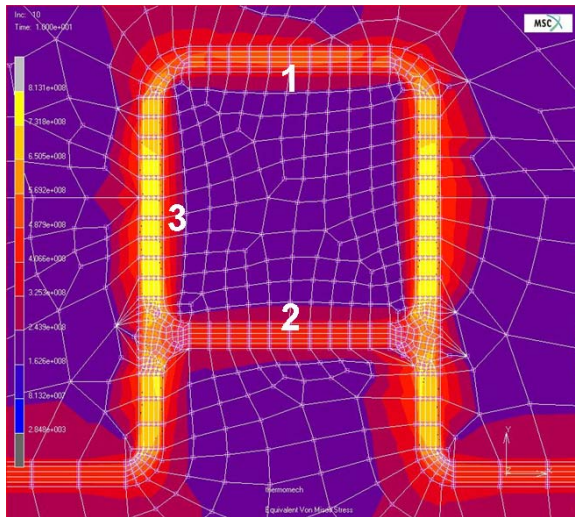
## WP3

- High index contrast waveguide technology is used
  - Smaller structures
  - Higher complexity of functions
- Fiber to chip alignment has to be more accurate
- MA3 further developed the one by one fibre assembly process.
  - Several dispense methods for accurate applying small amounts of tacking adhesive are evaluated.
  - Tooling for a test setup is developed and ordered.
  - Tests with different adhesives are planned.



## WP4

-TNO investigated the stress of sidewalls on polarization behaviour



The results show that variations in the dimensions of the waveguide have a small effect on the stress level at the inner surface of the silicon nitride part.