

fiCONTEC

PIC: Adding automated testing to automated assembly

Salland Test Technology Symposium, Zwolle, Sept. 26 – Sept. 27 2019
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Next Minutes

- Introduction
- Motivation
- About PICs
- Test scenario
- Conclusion

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That's me

ficonTEC

- SMU
- 200~ colleagues
- Since 2001
- Achim, Germany
- Machine building company
- High precision pick & place machines
- High degree of customization
- Market leader in optical assembly and test equipment

ficonTEC headquarter in Achim, Germany



Markets

- Opto-electronics
- Micro-Optics
- Diode Laser Manufacturing
- Datacom
- LIDAR



ficonteC headquarter in Achim, Germany

Motivation

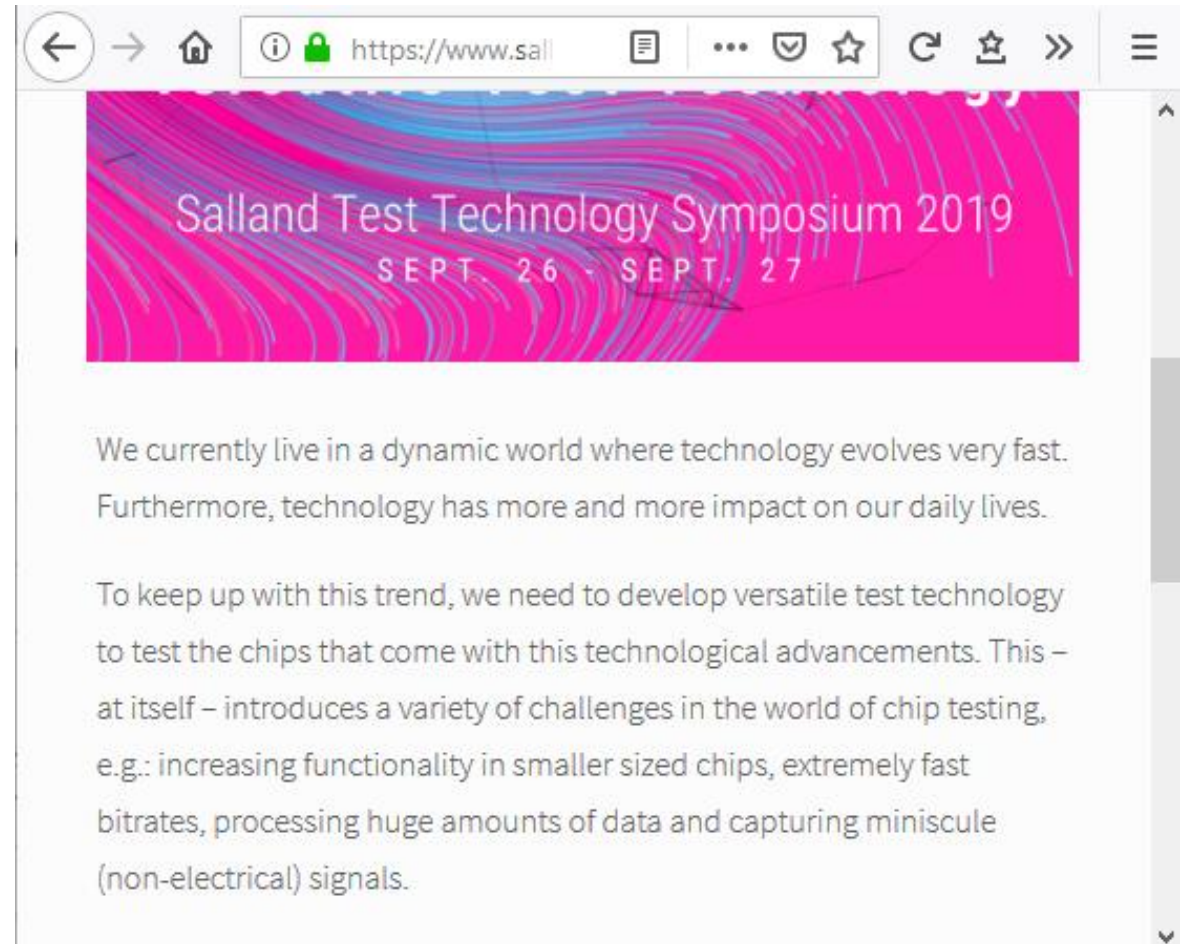
General

- Datacom demands for vastly growing bandwidth
- Big data
- Using light for faster channels
- Using light for denser packaging

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- Years of experience in high precision machines
- No commercial solution

Abstract from Salland Test Technology Symposium



Motivation

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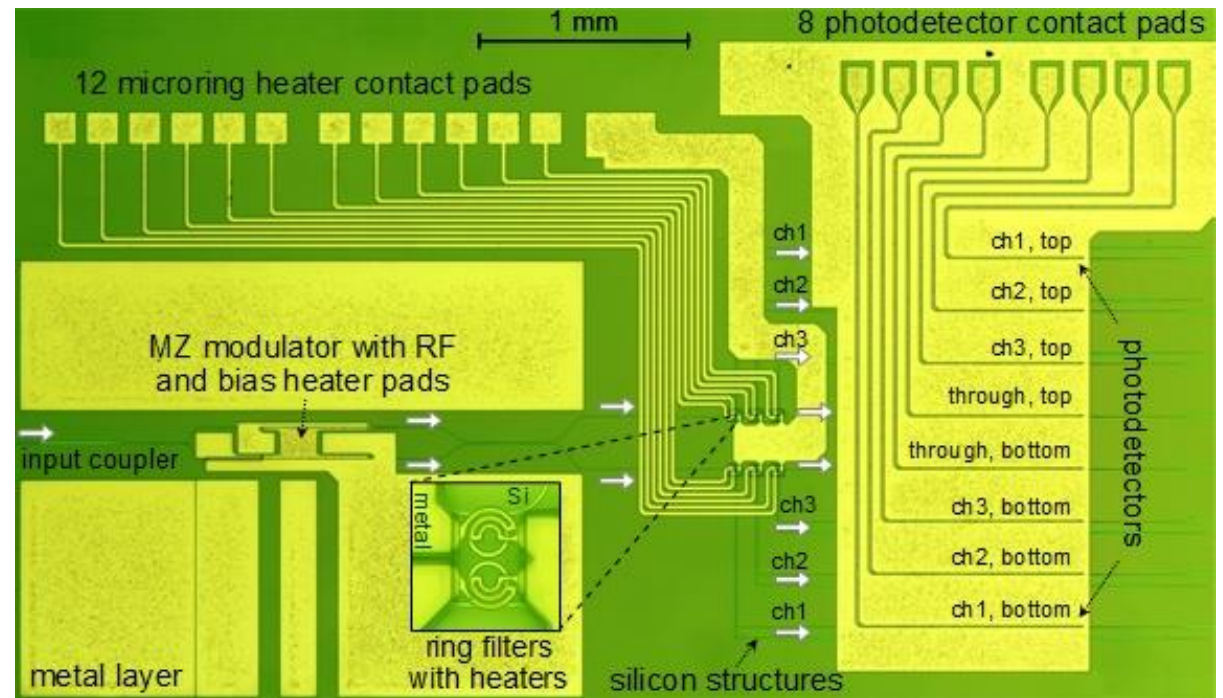
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- No commercial solution

Yellow wall at Lehman Brothers data center, posted on reddit .com



Introduction into PICs

- Photonic Integrated Circuit
- Light guiding structures within chips
- Small features
- Silicon wafer
- Optical testing



Integrated PIC, nanophotonics-labs-masdar.ac.ae

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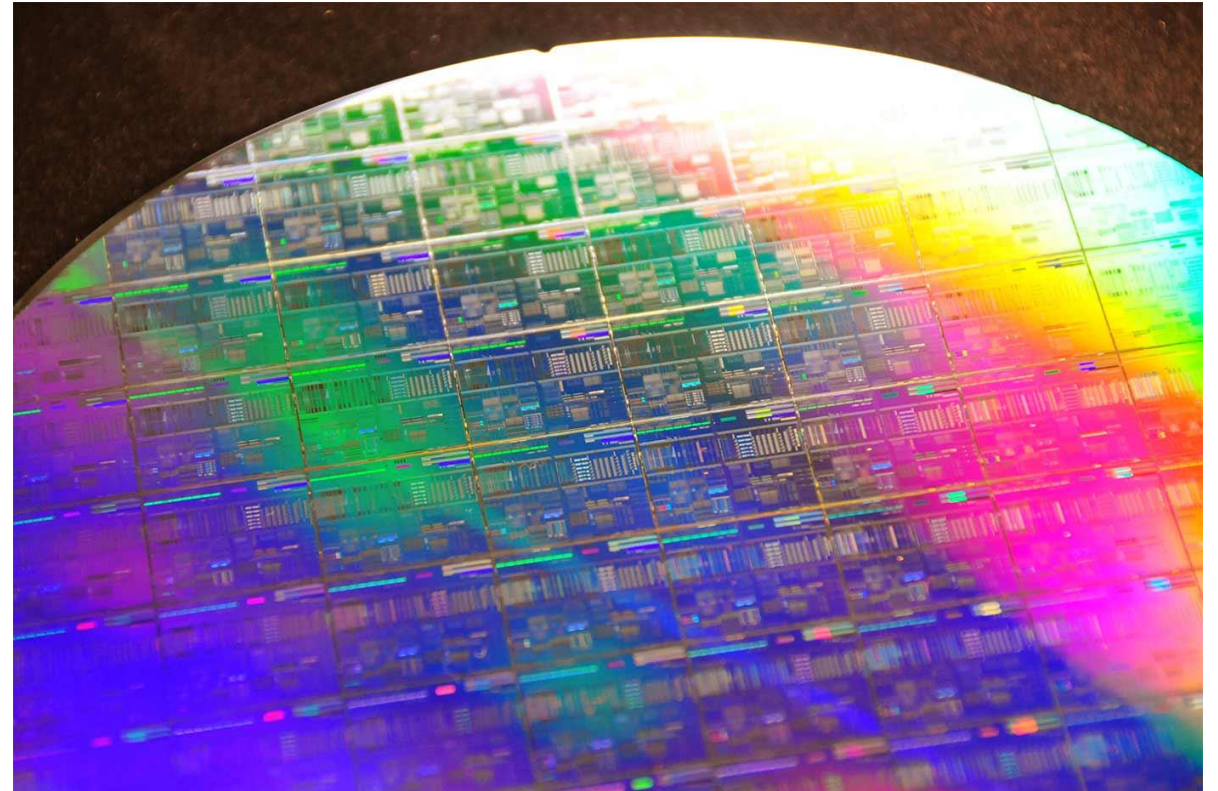
Wafers, www.balconidolciaria.com



Introduction into PICs

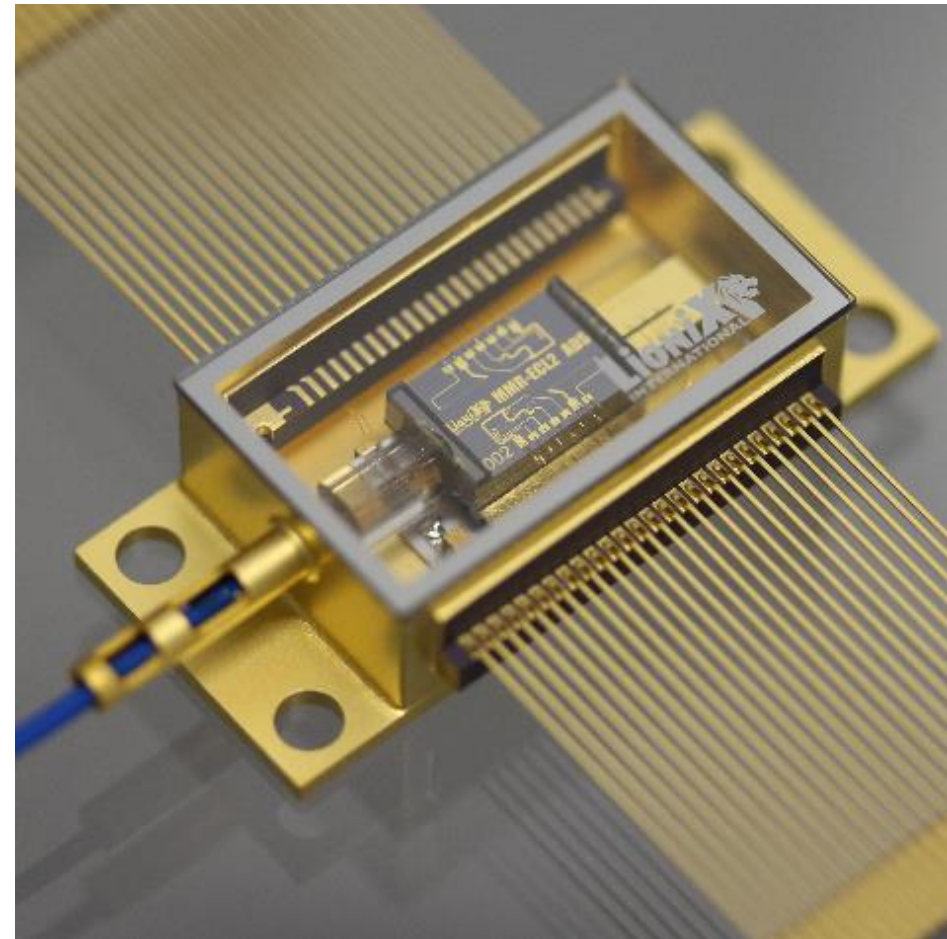
- Photonic Integrated Circuit
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Photonic devices on silicon wafer, ucsdnews.ucsd.edu



Packaging a PIC

- Approaching chip with fiber(s)
- Probing electrical/optical
- Active alignment needed
- Fixate

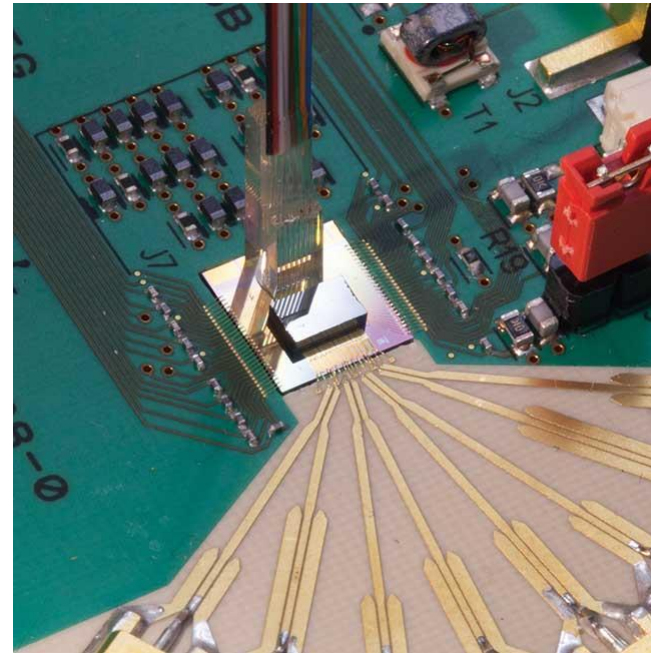


Packaged PIC, www.phix.com

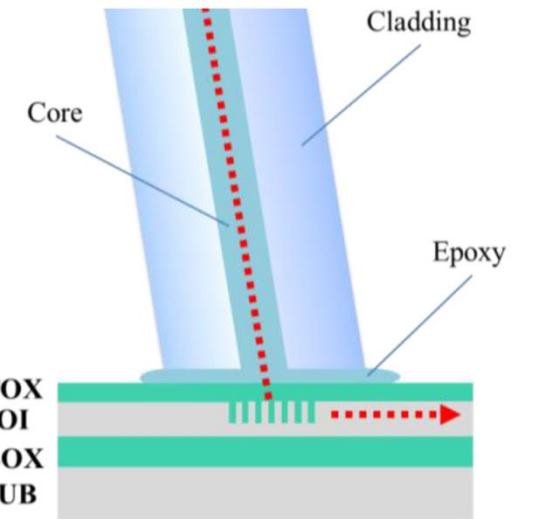
Testing a PIC

- Approaching chip with fiber(s)
- Probing electrical/optical
- Active alignment needed

- Testing: assembling w/o fixating
- Temporary coupling
- Wafer level



Integration with PIC, www.photonics.com

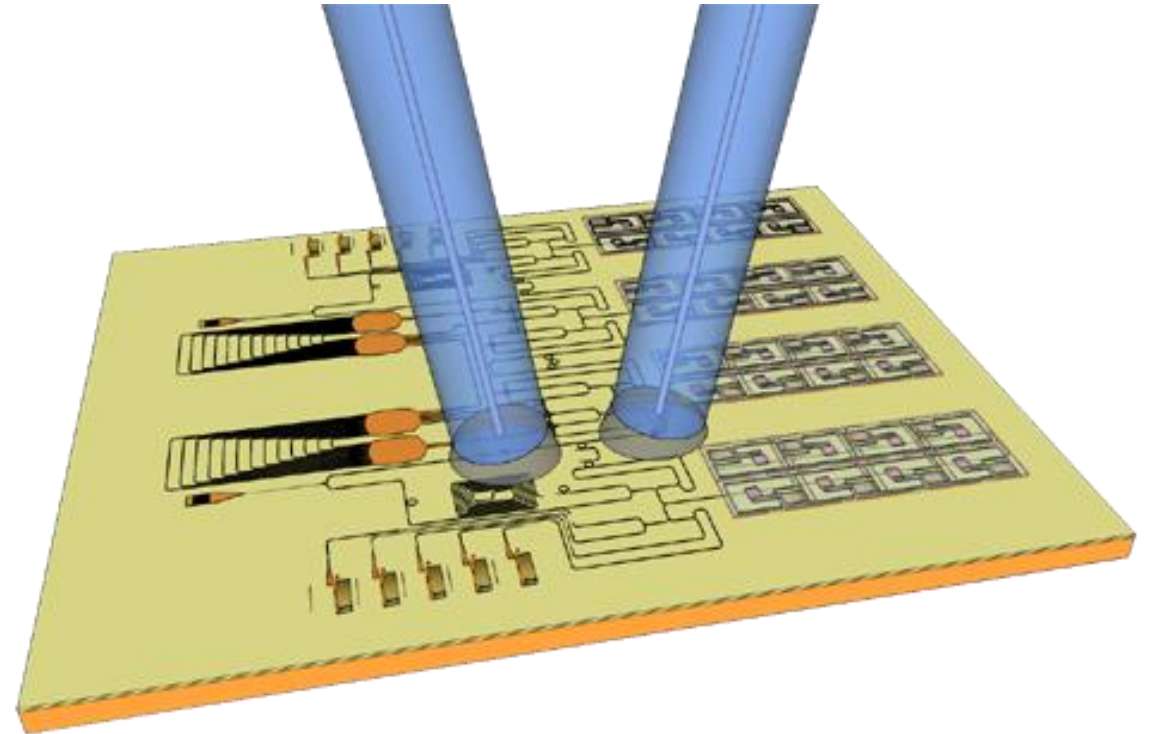


Fiber connection to grating coupler, www.mdpi.com

Testing a PIC

- Apply known value
- Examine result
- Fail/no fail

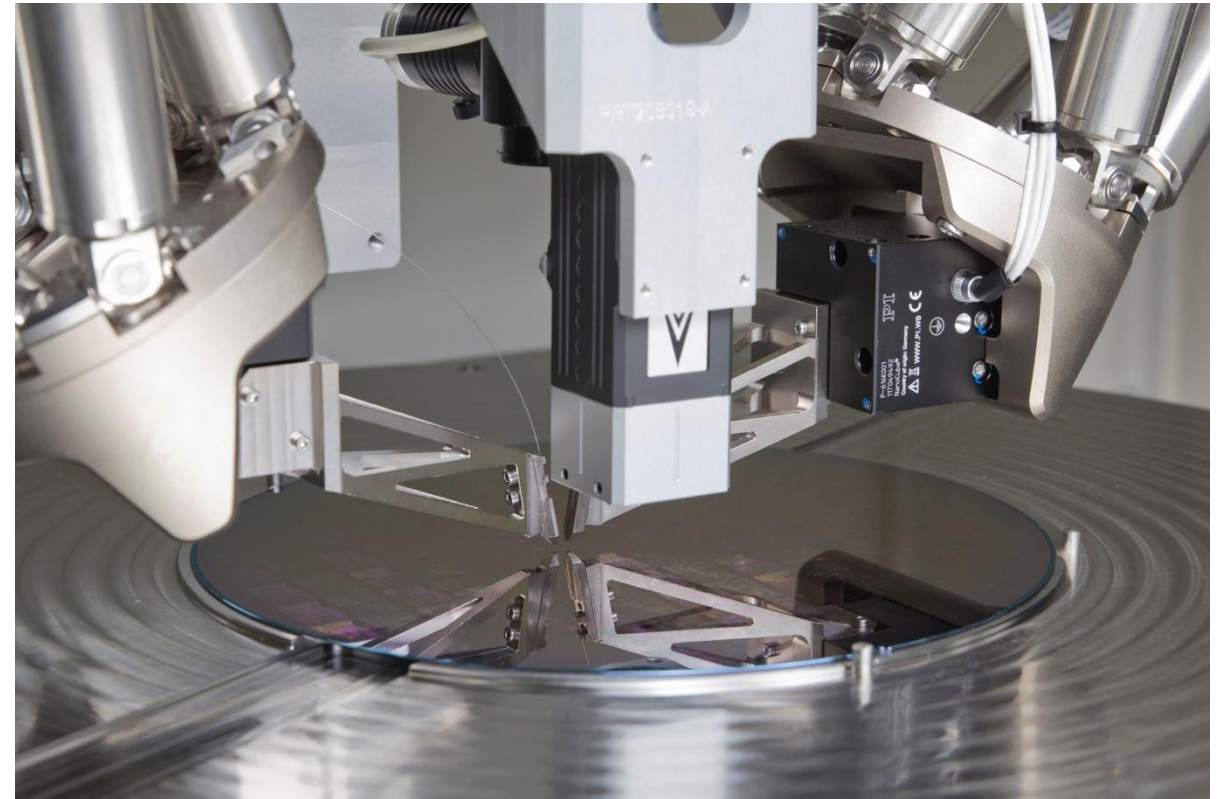
- Find probe point
- Find signal point
- And ... stand still!



Optical one channel probing, www.photonics.intec.ugent.be

Status

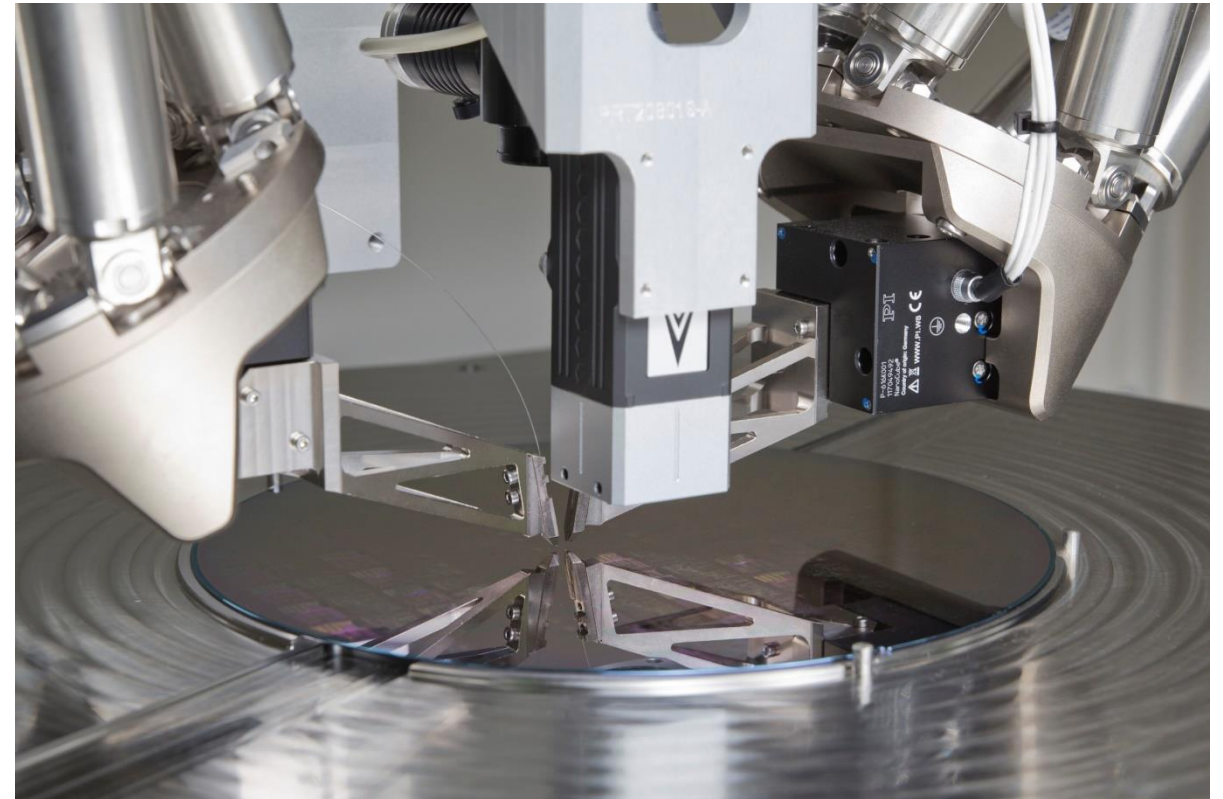
- First machines available
- Standard machine development in progress



Automated wafer testing, ficonTEC

Status

- First machines available
- Standard machine development in progress
- Longish process
- Single die testing



Automated wafer testing, ficonTEC

Challenges

- Photonic wafer level testing in early stage
- Small features (μm range)
- Analog/RF testing
- No large probe cards
- Definitions of tests (which tests)
- Characterizing vs testing
- No standard optical structures

Outlook

- Standardized Tests
- Stripped down metrology
- Ultimately full wafer probing
- Integration into production lines
- Partnering



Fiber optics test system, www.rohde-schwarz.com

THANK YOU !

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