Program March 28

Grand Hall

Plenary lectures

09.45-10.15 uur
Grand Hall

The impact of photonics in lithography
Arie den Boef, ASML Netherlands BV

The rapid developments in semiconductor industry have lead to many innovative products that have a significant impact on society. These innovations are fueled by the continuous reduction of device dimensions as described by Moore's law. Smaller devices on a chip allow the realization of more complex functions in a smaller volume that consume less energy. This in turn enables novel mobile applications like smart phones at even lower prices.

An important step in the production of semiconductor devices is optical lithography where a mask pattern is transferred to a resist film on the wafer. The exposed resist is developed and the resulting pattern is undergoing further process steps like etching or ion-implantation. The challenge in lithography is to print nm-sized resist patterns with nm-placement accuracy. Moreover, in order to make lithography economically viable a high productivity (wafers per hour) is also required. In order to realize these requirements sophisticated mechatronic systems (stages) and complex optical systems (projection optics and sensors) are necessary that have to operate in a very well controlled and stable environment.

Many of these mechatronic and optical systems in lithography rely on photonic devices like light sources, spatial light modulators and detectors. This presentation will show several examples of optical sub-systems that demonstrate how various photonic devices play a key role in enabling various important functions in lithography. This presentation will conclude with a short overview of some challenges where novel photonic devices/functions are possibly needed.

14.30-15.00 uur
Grand Hall

The Key Enabling Technology Photonics
Egbert-Jan Sol, TNO Eindhoven

The EU-commission has selected 6 key enabling technologies: materials, nanotech, photonics, micro-nanoelectronics, biotechology en advanced manufacturingsystems. The KET Photonics comprises light-in (solar PV), light-out (Solid state lighting) and light processing (lasers, nano-photonics, si-Photonics), all domains covered by Photonics21 too. As micro-nano-electronics we can switch electrons, but with today's smallest nano structures we can also control photons. The question is be whether we will encounter similar learning curves as with Moore's law. In the context of Solar PV such a learning curve for the next 10 to 30 years will be illustrated. Given these expected developments it will be clear that Photonics really is a Key Enabling Technology.

Room 8

Integrated Photonics

"Integrated Photonics" is all about realizing complex, optical functions on a very small footprint. Optical components including splitters, interferometers, filters, sources, detectors and modulators, are integrated on a common planar substrate. This substrate can be made of a broad range of material systems including semiconductors like. silicon or III-V, polymers, glasses or ceramics or a combination of such material systems. Today, integrated photonics has found its way to the market. But how to choose the right material system for your application? How to design your optical system on a chip? And what are the applications that entered the market today?

1.00-11.20 uur
oom 8

A heterogeneous silicon photonics platform for applications in communication and sensing
Gunther Roelkens, Photonics Research Group - Ghent University / imec

Silicon-based photonic integrated circuits are gaining considerable importance for a variety of applications, from data communications to sensors. This is mainly due to the expectation that the maturity and low cost of CMOS-technology can be applied for advanced photonics products as well. Other driving forces include the design richness associated with high refractive index contrast of Si/air as well as the potential for integration of photonics with electronics. Not all optical functions can be implemented on a pure silicon photonics platform however and require the heterogeneous integration of other materials on that same platform. Incorporating

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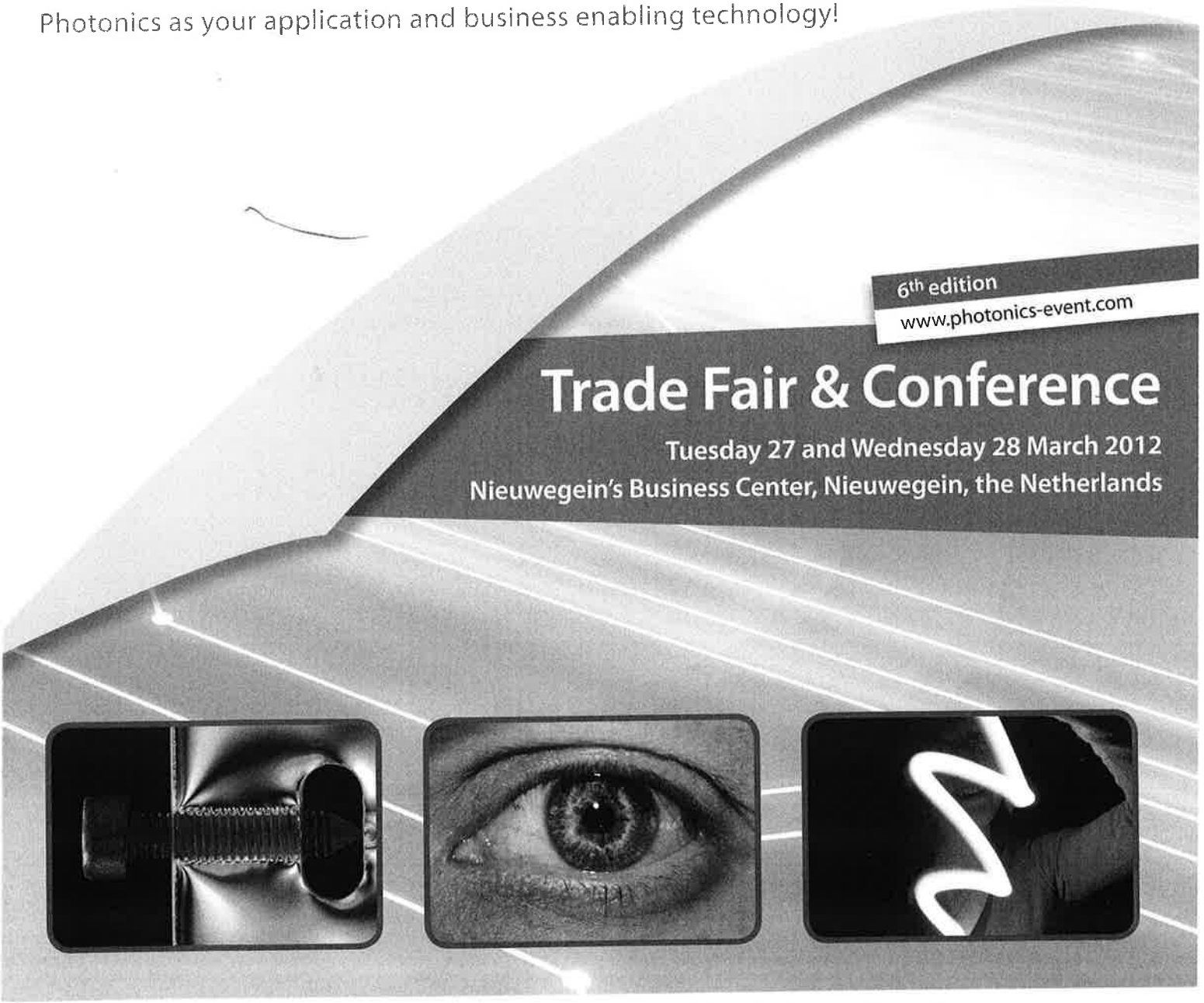
The impact of photonics in society and industry

Photonics as your application and business enabling technology!



Photonics Event 2012 is organised by Mikrocentrum and Photonics Cluster Netherlands empowered by the Dutch Ministry of Economic Affairs, Agriculture and Innovation.

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