# PRESS RELEASE

**Aachen, 27th April 2016**

## Dr. Ir. Armand Pruijmboom, Philips GmbH Photonics Aachen: Prize Winner of the Innovation Award Laser Technology 2016

**The Innovation Award Laser Technology 2016, initiated by the associations Arbeitskreis Lasertechnik e.V. and the European Laser Institute ELI and provided with 10 000 € prize money, has been conferred to Dr. Ir. Armand Pruijmboom, General Manager of Philips GmbH Photonics Aachen on 27th April 2016 in Aachen´s town hall. Dr. Ir. Armand Pruijmboom and his team have got the first place in the open prize competition with the innovation *VCSEL arrays: A novel high-power laser technology for "digital thermal processing"*. The jury composed by ten international experts has selected 3 outstanding finalists among the 15 submitted applications. In the historical ambience of the »Coronation Hall« around 320 guests attended the awarding ceremony.**

Dr. Paul Hilton, speaker of the international jury, pointed out the outstanding innovations of the 3 finalist project teams in the field of laser technology. The jury conferred the **1st prize of the Innovation Award Laser Technology 2016** provided with 10 000 € prize money to Dr. Ir. Armand Pruijmboom, General Manager of Philips GmbH Photonics Aachen (Germany) and his team for the innovation *VCSEL arrays: A novel high-power laser technology for "digital thermal processing"*. VCSEL stands for Vertical-cavity surface emitting laser-diodes. The innovative work of the Philips team consists in the development of the VCSEL array chips dedicated for high power application, the packaging and thermal management of the VCSEL arrays including comprehensive finite-element modeling, the system design by tailoring packages of various "standard building blocks" to specific industrial applications and finally the application development itself.

**The prize winner** Dr. Ir. Armand Pruijmboom has been awarded the title of »AKL Fellow« and »ELI Fellow«. The certificates for the first, second and third placed finalist teams were handed over during the award ceremony in Aachen by Ulrich Berners, president of the Arbeitskreis Lasertechnik AKL e.V. and Dr. Paul Hilton, president of the European Laser Institute ELI.

The **Innovation Award Laser Technology** is a European prize for applied research awarded at 2-yearly intervals by the associations Arbeitskreis Lasertechnik e.V. and the European Laser Institute ELI. The award can be conferred on an individual researcher or on an entire project group, whose exceptional skills and dedicated work have led to an outstanding innovation in the field of laser technology. The scientific and technological projects in question must center on the use of laser light in materials processing or the methods of producing such light, and must furthermore be of demonstrable commercial value to industry.

Mitglieder des Vorstandes:
Dipl.-Ing. Ulrich Berners (Vorsitz)
Prof. Dr. rer. nat. Reinhart. Poprawe M.A.
Dipl.-Phys. Axel Bauer (Geschäftsführer)
Dr.-Ing. Dipl.-Wirt.-Ing. Bernd Schmidt

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The **international jury composed by 10 members** selected on the basis of merit and the published criteria 3 outstanding finalists among the 15 applications for the Innovation Award Laser Technology 2016 (see detailed descriptions of the three innovations including photos on www.innovation-award-laser.org).

**The 3 finalists** and their teams listed in final ranking:

**1st Place**

**VCSEL arrays: A novel high-power laser technology for "digital thermal processing"**

Team:

**Dr. Ir. Armand Pruijmboom, Philips GmbH Photonics Aachen, Germany (Team Representative)**

Dr. Günther Derra, Philips GmbH Photonics Aachen
Dr. Pavel Pekarski, Philips GmbH Photonics Aachen
Dipl.-Ing. Carsten Deppe, Philips GmbH Photonics Aachen
Dipl.-Ing. Ralf Conrads, Philips GmbH Photonics Aachen
B. Sc. Felix Ogiewa, Philips GmbH Photonics Aachen

Industrial manufacturing equipment for heating large areas with high throughput conventionally uses among others gas burners, hot air blowers and electrically or halogen lamp heated belt ovens. Due to their limited power density, high thermal inertia and low spatial selectivity, these heating methods can be switched on and off only slowly. Furthermore, they are inaccurate and cannot easily deposit the heat only where it is needed or do not allow to impose sophisticated spatial thermal profiles on a work piece. On the other side conventional laser technology has disadvantages in this application mainly for cost reasons. Development of high power lasers has traditionally focused on brightness. Treating large surfaces with high brightness sources requires either complex optics or scanning systems. Each one comes along with technical limitations but more importantly with a severe cost impact. Vertical-cavity surface emitting laser-diodes (VCSEL´s) offer an innovative solution by heating only when and where it is needed in a short time with cost effective, compact and robust systems. Compared to conventional non-laser based heating technologies, VCSEL arrays offer flexibility, high efficiency and lifetime. As a solid state technology VCSEL´s fuel the trend to fully digitized manufacturing flows. The technology is bound to penetrate a large number of manufacturing processes and thereby adds a new and cost effective member to the family of high power lasers.

**2nd Place**

**Laser Beam Remote Welding of Aluminium for Automotive Lightweight Design**

Team:
**Dr.-Ing. Jan-Philipp Weberpals, AUDI AG, Neckarsulm, Germany (Team Representative)**
Dipl.-Ing. Steffen Müller, AUDI AG, Neckarsulm
Daniel Böhm, AUDI AG, Neckarsulm

The core of future automotive lightweight design is a flexible and at the same time stable joining technology of lightweight materials. A new approach in particular is laser beam remote welding of aluminium. The continuous challenge during this innovation was to combine the known options of laser beam remote welding of steel components with the material-specific properties of aluminium materials within a process. Up to now laser beam welding of monolithic aluminium joints, in particular using a fillet weld connection in a lap joint, has been realized only with tactile-guided processing optics. This results in an increase of process time. The laser beam remote welding demonstrates time savings of approximately 53% when compared to tactile laser welding. The method enables heat management control in the part. Exact positioning of the laser beam in relation to the edge reduces susceptibility to hot cracking because of precise weld penetration control. The gap dimension between the parts can also be determined during the joining process, and can be effectively closed by control strategies. Process efficiency is enhanced by eliminating the need for supplemental welding wire and protective gases. This reduces ongoing production costs. Moreover heat-related distortion is reduced. All of these advantages pay off, especially the ability to implement lightweight design with smaller flanges. The welds in the door frame of the Audi A8 illustrate this well. Audi is the first car manufacturer being able to use laser beam remote welding to join conventional aluminium alloys.

**3rd Place**

**UVblade - Flexible Display Manufacturing by the Meter**

Team:
**Dr. rer. nat. Ralph Delmdahl, Coherent LaserSystems GmbH & Co. KG, Göttingen, Germany (Team Representative)**
Dipl.-Phys. Thorsten Geuking, Coherent LaserSystems GmbH & Co. KG, Göttingen
Dr. rer. nat. Sven Passinger, Coherent LaserSystems GmbH & Co. KG, Göttingen
Dipl.-Ing. Rainer Pätzel, Coherent LaserSystems GmbH & Co. KG, Göttingen
Dr.-Ing. Kai Schmidt, Coherent LaserSystems GmbH & Co. KG, Göttingen
Dipl.-Phys. Hans-Stephan Albrecht, Coherent LaserSystems GmbH & Co. KG, Göttingen

Mobile devices with novel flexible displays have just started to enter the market. Smartwatches thin and light as a feather with round-shaped and high resolution display as well as smartphones with individual display shapes and designs are found in everyday live and combine functionality with attractivity. The supply of curved TV-screens evolves continually. It is also conceivable to stow the complete hardware in a handle and pull the rolled up display out like an ancient papyrus scroll. As of today, the flexible display market is about to transform from a niche to a mass market. The UVblade system provides a meter-long, thin blade of UV laser light which smoothly separates a flexible polymer layer from the rigid glass carrier in the so-called lift-off process. The separated display electronics layers reside thus on the lightweight and bendable polymer film resulting in a paper thin and flexible display. Via laser lift-off processing with the UVblade it is possible for the first time to transfer displays (LCDs, OLEDs, electrophoretic displays) to ten times thinner and more lightweight polymer carriers. Alternative separation techniques are largely unsuitable for mass production. Chemical etch processing for example is slow and unspecific while frequency-

converted laser technologies provide only scarce output power in the UV. With the innovative development of the UVblade platform the Coherent team has brought an excimer laser system to the market which enables the cost-efficient volume production of the latest generation of flexible displays independent of the display diagonal.

**The 10 members of the international jury** of the Innovation Award Laser Technology 2016 have been recruited from industry and the research community:

- Dr. Keming Du, EdgeWave GmbH, Würselen, Germany
- Dr. Paul Hilton, TWI, Cambridge, United Kingdom
- Prof. Dr. Wolfgang Knapp, CLFA, Université de Nantes, France
- Dr. Alexander Knitsch, Trumpf Laser GmbH & Co KG, Ditzingen, Germany
- Dipl.-Ing. Volker Krause, Laserline GmbH, Mülheim-Kärlich, Germany
- Prof. Dr. Veli Kujanpää, VTT, Lappeenranta, Finland
- Prof. Dr. José Luis Ocaña, Centro Láser U.P.M., Madrid, Spain
- Prof. Dr. Andreas Ostendorf, Ruhr-Universität Bochum, Germany
- Dr. Jochen Stollenwerk, Lehrstuhl TOS, RWTH Aachen, Germany
- Dipl.-Ing. Stefan Wischmann, ThyssenKrupp Steel AG, Duisburg, Germany

**Further information:**

- **Regarding the award and the finalists:** www.innovation-award-laser.org
  Descriptions of the realized innovations of the 3 finalists and photos of the awarding ceremony on 27th April 2016 in Aachen´s town hall can be downloaded here.

- **Regarding Arbeitskreis Lasertechnik AKL e.V.:** www.akl-ev.de
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- **Regarding European Laser Institute ELI:** www.europeanlaserinstitute.org
  Contact person: Dr. Paul Hilton, President of the European Laser Institute,
  Phone: +44/1223 899000, Fax: +44/1223 892588
  Email: contact@europeanlaserinstitute.org

- **Regarding International Laser Technology Congress AKL´16 (27-29 April 2016):** www.lasercongress.org
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