

TWENTE COMPANY FIRST OF ITS KIND IN PHOTONIC CHIP PRODUCTION

High-precision machine placement of glass fibres for large chip production volumes

Europe is at the threshold of a technological revolution - the application of the power of light to solve our greatest global challenges. As a fast, compact, energy efficient and therefore sustainable option, it is suitable for many applications and will be an essential component of the societal challenges of the future. An important future market is the photonic chip market. The new assembly machine presented by the Fraunhofer Project Center will allow large-scale photonic chip production to become a reality in Twente. This is a first, since this high-precision work has been performed by hand for small series until now. It is therefore an important step towards mass production of the fast and energy-efficient chips for telecommunications, among others. The machine has been developed in collaboration with PHIX Photonics Assembly, an international innovator in the field of assembly and packaging services for the photonics industry.

Photonic chips are rapidly becoming widespread. They will probably tap into a world market in the new 5G mobile standard - chips that work with light are fast, broadband and energy efficient. Photonics offers great benefits in many other applications too, for instance in sensors for medical applications. Success depends on the possibility of producing and assembling the chips in large quantities. The new machine is a determining step. It places Twente at the forefront of technological development. Large-scale photonic chip production is expected to create thousands of new job opportunities.

Making the connection

The machine, developed for PHIX, is able to make the connection between the chip and the 'outside world' via sixteen extremely fine glass fibres (fibre array) which are placed in the correct position one by one. Placing the glass fibres and the chip holders is the next step in the automation process. Up to now these have all been labour-intensive production steps, the high cost of which has posed a barrier to large-scale introduction. The machine is based on an assembly platform developed at the Fraunhofer Institute for Production Technology (IPT) in Aachen. This platform is being developed further for photonics applications at the Fraunhofer Project Center at the UT, which is a collaboration between the UT, the Fraunhofer IPT and Saxion focusing on advanced manufacturing. The Fraunhofer Project Center collaborates closely with PHIX Photonics Assembly on this project. Albert Hasper, PHIX director: "The market demand for equipment based on photonics technology will see an exponential increase. This is only the beginning. The new machine will facilitate the widespread use of chips in detecting, generating, sending, measuring and managing light."

Photonics cluster in Twente

The new assembly technology will strengthen the existing photonics activities in Twente, from basic research to new business. Photonics has a strong presence in a cluster of University of Twente research groups, in the MESA+ Institute for Nanotechnology; in the 'Applied Nanotechnology' programme at Saxion University of Applied Sciences; in about ten Twente photonics companies, including LioniX International, Phoenix Software, DEMCOM, Thales, PANalytical, IDEX Optics & Photonics, Lightmotif and Sumipro; and in some photonics spin-offs from Twente such as Dovidex Medical, Next Scan Technology, HyBriScan and Solmates. The high-tech Twente region constitutes an integral part of PhotonDelta, the (inter)national ecosystem for integrated photonics.