

Computer data at the speed of light

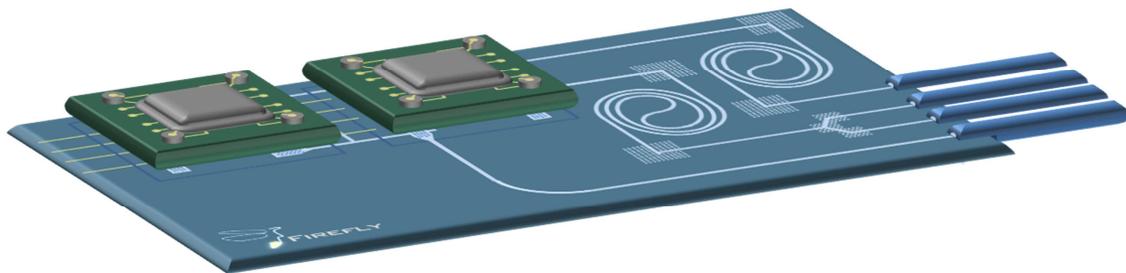
with Multilayer Photonic Circuits made by Nano-Imprinting of Waveguides and Photonic Crystals

The increasing demand for higher data rates in information and communication technology leads to continuously increasing performance of microprocessors. This has led to the introduction of optical data transmission (e.g. glass fibre) as a replacement of electronic data transmission (e.g. copper wire) in most transmission applications longer than 10 meters. *However, a need for optical data transmission for shorter distances inside the computer has come.*

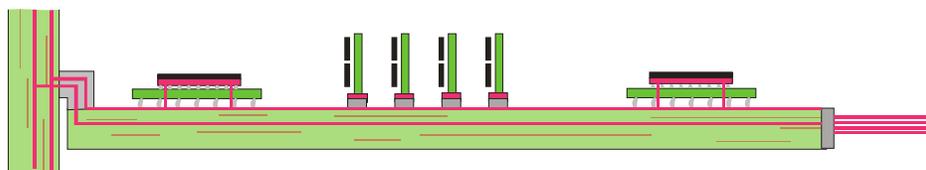
In October 2011 a new project, named FIREFLY, has started, in which new optical components will be developed, that will make it possible to transmit data over short distances. With these new components, the data transmission in computers can become much faster than with the electronic components currently used. The full name of the project is “Multilayer Photonic Circuits made by Nano-Imprinting of Waveguides and Photonic Crystals”.

The FIREFLY consortium consists of partners from the industry, IBM Research, TE Connectivity, VERTILAS and Momentive as well as research groups from TNO, IMEC, VTT, Tyndall and the University of Utrecht. In this shared research project forces are combined from materials, processing and device expertise to develop the nano and micro components needed for the transportation of light for the optical data communication, based on polymer waveguides.

Innovative polymers, new applications of nano-technology as well as new methods for light in- and out coupling and the integration of all these new components are the technical ingredients of this ambitious project. An illustration of the final concept is shown in the figures underneath.



*Figure: Example of Board level Photonic Integrated Circuit
Two processors including communication with Vertical-cavity surface-emitting lasers (VCSELs) to the optical board below them, including four waveguide to fibre couplers.*



*Illustration of optical interconnects on a printed circuit board (PCB) shown by the pink lines.
Source: IBM Research GmbH.*

More details about the project are presented on www.fp7-firefly.eu.