



PRESS RELEASE

1. Prize Berthold Leibinger Innovationspreis 2006

**Dr. Karin and Raimund Schütze
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A Company of the Carl Zeiss Group
Bernried, Germany**

Capturing Single Cells with “Laser MicroBeam” and “Laser Catapult”

The laser-based tools made by the German company P.A.L.M. Microlaser Technologies GmbH are now standard equipment for researchers around the world who focus on cancer research, genome or proteome projects. Years ago, biophysicist Dr. Karin Schütze had to conduct her research with tools she felt were in urgent need of improvement. So, together with her husband Raimund Schütze, she devoted herself from that point on to the development of high-precision and at the same time easy-to-use microtools: The “laser tweezers”, “laser microbeam” and “laser catapult” can move, capture, separate, or extract individual cells for further diagnosis.

It has only been 20 years since scientists at the Heidelberg Institute for Physical Chemistry conducted the first cell surgery and cell fusion experiments with a laser microbeam system. To work in the micro range at that time, one required systems which filled an entire room. These systems were difficult to operate and not nearly as reliable and precise as those used today. Thanks for the most part to biologist Dr. Karin Schütze and the goldsmith Raimund Schütze, who studied some semesters of physics and electrical engineering, adequate equipment now fits laboratory tables.

During her studies in Berkeley, USA, in 1990 the physicist Art Ashkin let Karin Schütze in on the secrets of his invention, the laser tweezer. The focused light of the laser tweezer is capable of capturing smallest particles, sperms or single cells in liquid as if an invisible hand was gripping them and it enables them to be moved on the microscope slide. The laser microbeam enables for cutting of tissues in the microscope without contact and to separate single cells from neighboring tissue. The light pulse of the laser, focused on the underside of the sample, also enables individual cells to be catapulted out of the plane into a collection receptacle. Even living stem cells are not damaged in the process.



The objective was then to design laser micro tools more powerful than the existing ones for non-contact micromanipulation. Each innovation gave rise to another. A dedicated team of employees implemented new ideas and brought them to international market. Automated and easy-to-calibrate laboratory equipment was developed from manually-operated experimental assemblies. By non-contact catapulting of cell material using a laser beam, Karin and Raimund Schütze used a physical phenomenon that, even today, is not fully understood.

P.A.L.M. – a subsidiary of Carl Zeiss MicroImaging GmbH since the end of 2004 – developed from a start-up company to one which has won several prizes and has international standing – a fact itself that is prize-worthy. The decisive factor for the judges of the Berthold Leibinger Innovationspreis, however, was the fact that this good idea has been translated into a product and successfully marketed.

The unique way in which samples are processed and extracted without contamination, using a laser has led to many new approaches in research and, as a result, to new expertise. Since the PALM MicroBeam principle has been established primarily in cancer and gene research, the tool has also found its way into other areas: This non-contact technology is becoming more significant in functional genome and proteome research, in stem cell research as well as botany and forensics.

Title of work:

Laser Microbeam and Laser Catapult for Single Cell Capture

Digital pictures of the prize winners and the awarded work are available at www.leibinger-stiftung.de.