



1. Prize – Workgroup Disk Laser, Institute for High-power Beam Technology, University of Stuttgart, Germany



"Disk Laser"

The disk laser is one of the most important developments in recent laser technology. Based on a revolutionary new concept, it allows a whole range of new possibilities with its high-efficiency beam quality, high laser output suitability and ultra-short pulse capacity. This laser-source concept will improve existing applications in material processing, laser medicine, and other sectors while enabling new applications yet to come.

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The great significance of laser technology derives from the multitude of possible applications. Laser technology has become essential to almost every sphere of daily life, not only in obvious applications (such as laser medicine or the use of CD-players) but also less noticeable ones, such as production technology as well as the manufacture of microchips, picture tubes, vehicles, and much more.

All kinds of lasers with various characteristics are used for specific applications, but all too often, the ideal laser for a particular application does not exist. Physicists and engineers are therefore always in search of new and improved types of lasers which may be more economical and effective.



A Powerful New Type of Laser

The so-called disk laser is not only a new laser type, but also represents a new concept that can cover a broad range of specifications. Its extraordinarily high degree of efficiency and simultaneous high beam quality make it very interesting for commercial use.

The disk laser combines a series of new technologies, developed for the high-powered diode laser as a so-called pump source. Today's highly compact diode lasers deliver high output while retaining a very high degree of efficiency; but because of their beam characteristics they cannot be used directly in many applications. The disk laser concept makes use of the benefits of the diode laser in order to pump wafer-thin, disk-shaped laser media.

The disk geometry creates decisive advantages, but it has also generated serious physical and technical difficulties for scientists. To overcome these and defy the skeptics requires courageous research and development, as well as provident funding and committed entrepreneurs.

In 1990, at the Laser Institute at Stuttgart University, it became clear that only an entirely new laser concept could successfully open up new fields of application. In 1991, with this objective in mind, Professor Hugel asked Dr. Giesen to form a working group to study the subject, and to devote all its resources to the research tasks required.

Today the disk laser is very important to industry – laser manufacturers and users alike. More than 15 licenses have been issued worldwide by the working group, and the first commercial disk lasers are doing very well on the market. The development of the disk laser makes it clear once again how much the efficiency of industry depends on the innovative work of research groups at institutes and universities.

The "Disk Laser Working Group," which won first place in the Berthold Leibinger Innovation Prize 2002, comprises nine employees and former members of the internationally renowned Laser Institute, the owners of the essential patents, and the head of the Institute.