

DF 13: PV VI

Time: Tuesday 14:00–14:45

Location: H1

Plenary Talk

DF 13.1 Tue 14:00 H1

The Thin-Disk Laser - from Physics to Industrial Applications — •THOMAS GRAF — Institut für Strahlwerkzeuge (IFSW), University of Stuttgart

The unique properties of the thin-disk laser result from the arrangement of the laser-active medium as a thin crystal disk which is pumped very intensively and efficiently by diode lasers and which can be cooled much more homogeneously than conventional solid-state slab or rod lasers. The thin-disk geometry was originally motivated by the reduction of thermally induced aberrations to facilitate the generation of good beam quality at high average powers. But the thin gain medium

has also significant advantages for the generation of ultra-short pulses (e.g. due to reduced nonlinearities) and the application in industrial materials processing (e.g. due to the ruggedness against back reflections). All this makes the thin-disk laser an interesting tool for many applications ranging from fundamental science to industrial manufacturing. Starting from the basic laser physics the presentation will discuss the specific properties of thin-disk lasers and highlight some of the many fascinating applications ranging from the measurement of the proton radius to cutting of carbon fiber reinforced plastics (CFRP). The examples also illustrate how the specific requirements of given applications determine the goals for the development of suitable laser sources.