

## Laser Micro Machining

at the Danish Technological Institute Center for Microtechnology and Surface Analysis

VIDENUDVIKLING VIDENANVENDELSE VIDENOVERFØRSEL



# Brief overview

- The center has been involved in laser micro machining since 2001
- Currently we have three lasers for machining and one for bonding
- Most of our costumer are R&D department
- We also do small-scale production



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## The Excimer laser

- KrF 248 nm
- 5 ns pulses
- 5 W average power
- Pulse on demand up to 300 Hz
- Mask projection
  - Homogeneous over 3 x 4 mm beam
  - Demagnification 5 to 10 times gives an area of 300 x 400 µm to 600 x 800 µm on sample



## **Examples Excimer**













# The fs-laser

- Ti:saphire amplified system 775 nm
- 150 fs pulses
- 2 W average power
- 6 kHz rep. rate
- Pulse on demand
- Direct writing



- Galvanometer scanner (45 x 45 mm 25 µm spot size)
- Linear stages 200 x 200 mm (spot size down to <1 µm)</li>

### **Examples fs-laser**



PET



PTFE



#### Steel



#### Steel





#### Glass



#### Teflon

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# CO<sub>2</sub> laser

- CO<sub>2</sub> 10.6 µm ■ 25 W
- Direct writing
  - Galvanometer scanner 100 x 100 mm (spot size 200 µm)





## **Diode laser**

- Diode 880 nm
- cw 50 W
- Galvanometer scanner 120 x 120 mm
- Used for bonding

Injection moulded microfluidic system





Cross section of transparent system using IR-absorber







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