



MICROMACHINING APPLICATION NOTE

LASER WORLD OF PHOTONICS
- MUNICH, GERMANY -

June 2017

MICROMACHINING LASERS

FEMTOSECOND – **DIADEM** Series



3 wavelengths
Tunable from < 500 fs to 10 ps
Single shot to 1 MHz
From 10 to 30 W
<500 fs or tunable including
GDD pre-compensation
Up to 40 μ J

PICOSECOND – **SIRIUS** Series



3 wavelengths
Single shot to 1 MHz
7 W
< 10 ps
Up to 200 μ J

ELECTRONIC FEATURES FOR LASER CONTROLS

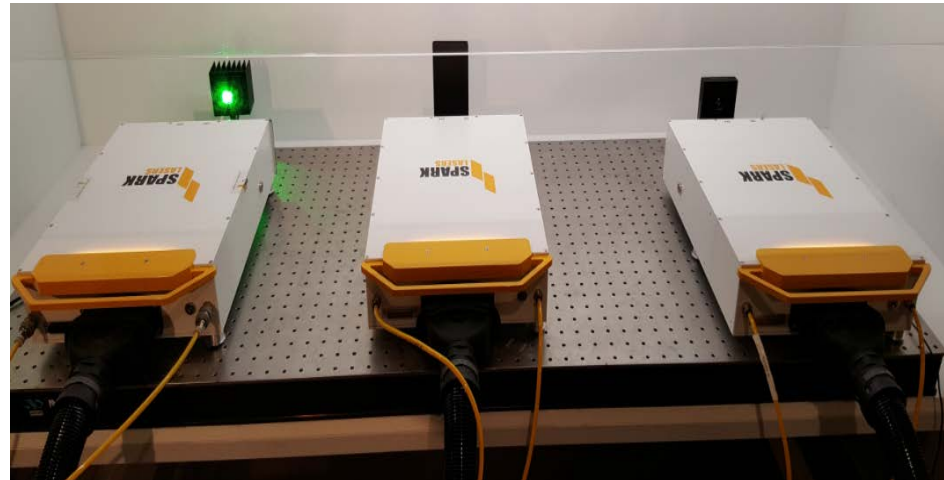
- Common to our **DIADEM** & **SIRIUS** micromachining laser series:
 - **SYNC-IN:** User can input any signal coming from a 3rd-party asset.
REAL INDUSTRIAL SYNC IN.
 - **SYNC-OUT:** It provides a synchronized output signal from our laser to an external 3rd party.
 - **Tunable pulse duration:** We can tune any pulse from < 500 fs to < 10 ps.
 - **Low timing jitter:** special feature able to provide an ultra-fast electronic communication < 10 ps.
 - **Gating:** enables various pulse controls either internally (through the GUI) or externally through the serial communication port.
 - **Burst mode:** available up to 20 sub-pulses having even amplitude and divided amount of energy for a given pulse duration.

HIGH MANUFACTURING STANDARDS – **QUALITY**

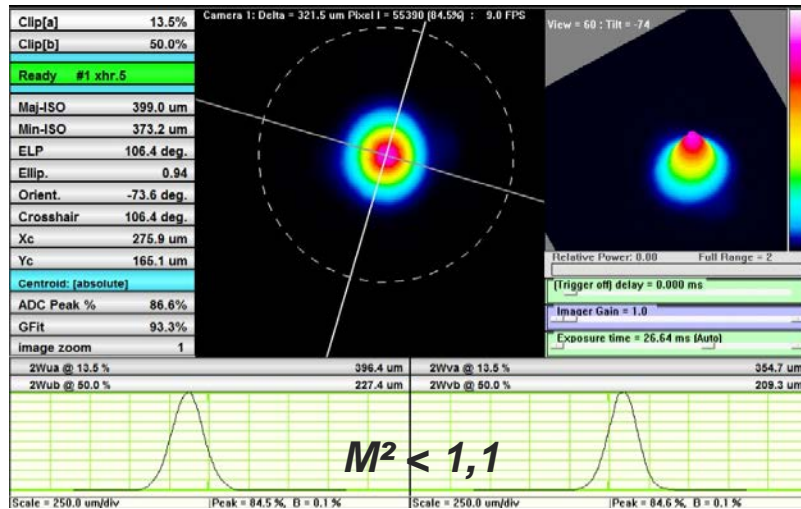


**HIGH QUALITY,
CONTROLLED
ENVIRONMENT**

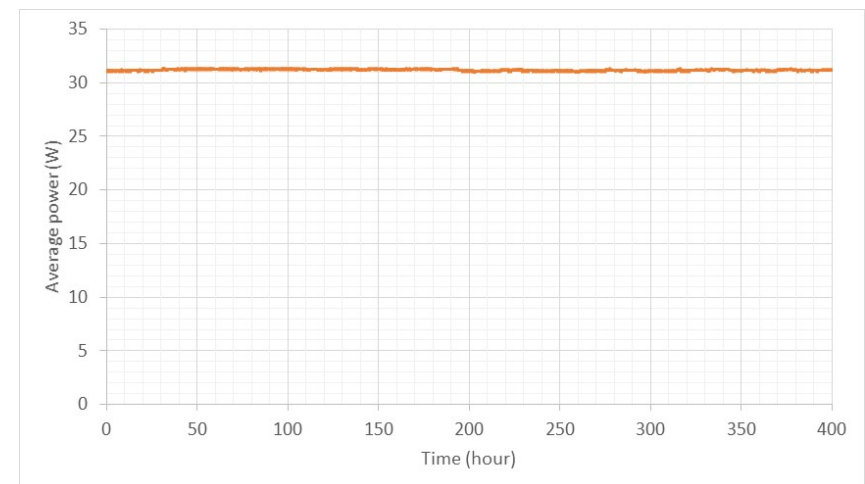
**INDUSTRIAL
ENVIRONMENTAL
TESTING**



HIGH MANUFACTURING STANDARDS – PERFORMANCE

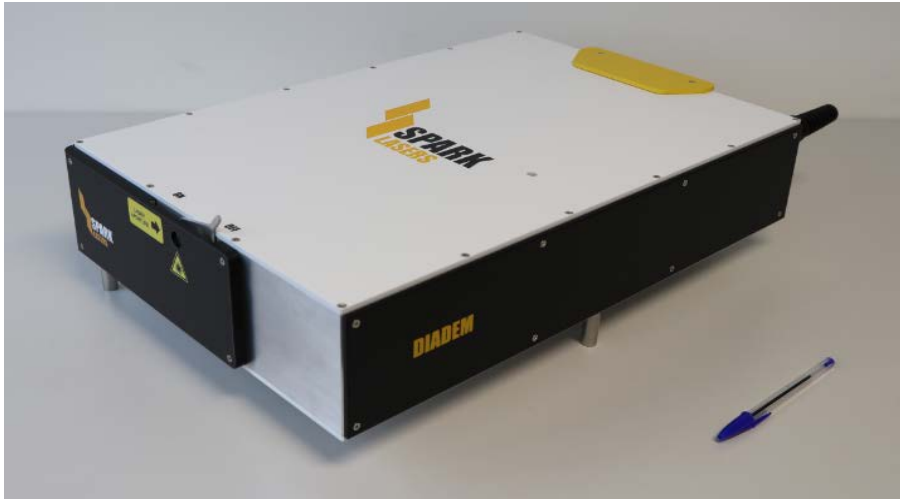


Long term burning tests showing perfectly even full average power vs. time



Ultrafast pulse duration

HIGH MANUFACTURING STANDARDS – COMPACTNESS



*World's most compact
air-cooled,
femtosecond laser head*

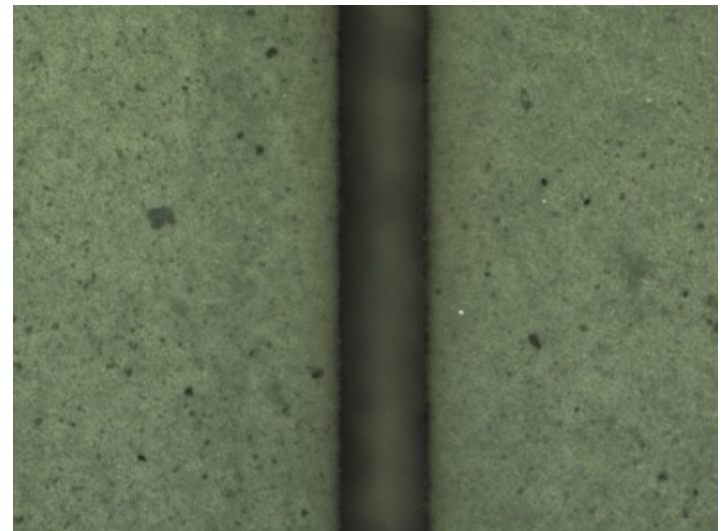
*Compact 2U, 19" rackable
controller*



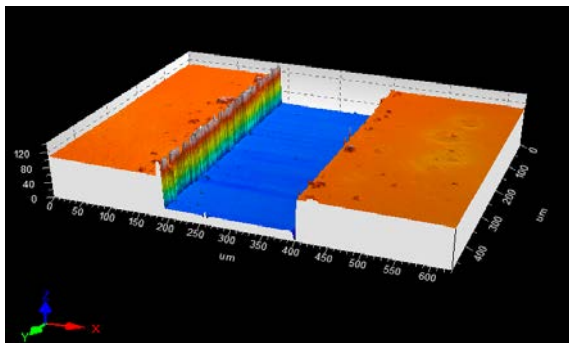
APPLICATIONS - SOLAR



Thin film ablation – Thin layer scribing of ceramics/teflon on SS

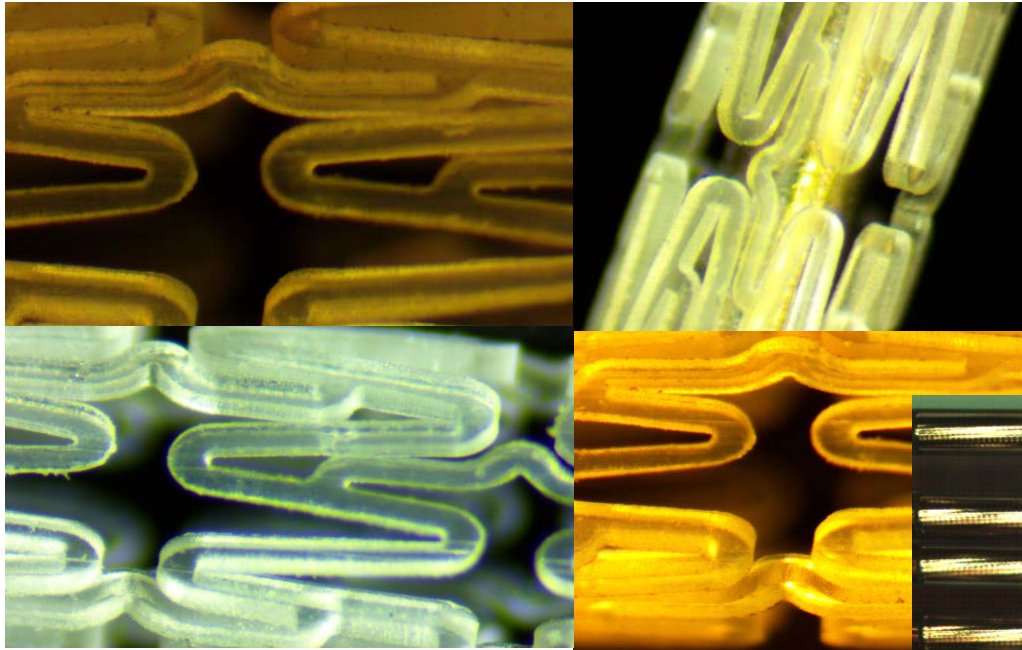


50, 200 , 500 μm scribing



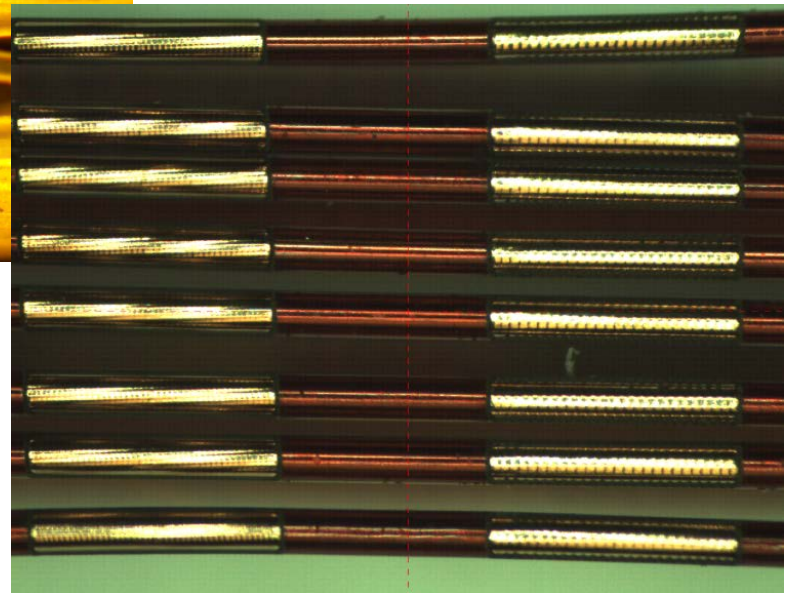
Processed with SIRIUS

APPLICATIONS – IMPLANTABLE MEDICAL DEVICES



Stent cutting –500
 μm thick PLLA stent
cutting

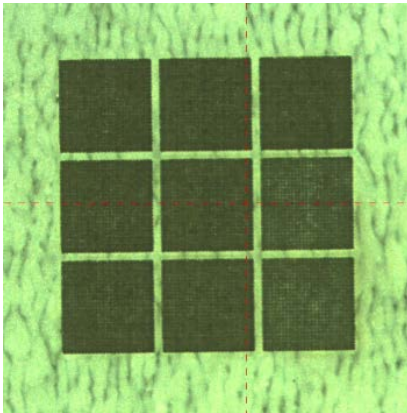
**25- μm Polyimide
layer removal from
100 μm \varnothing thick Cu
wires**



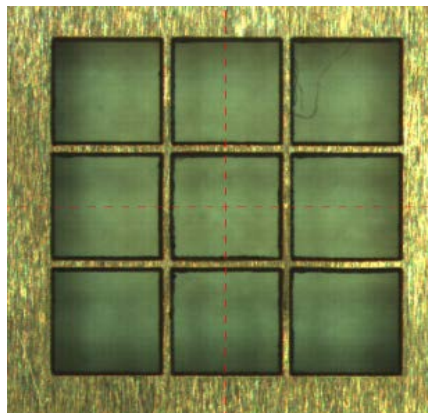
Processed with DIADEM

APPLICATIONS – CONSUMER ELECTRONICS 1/2

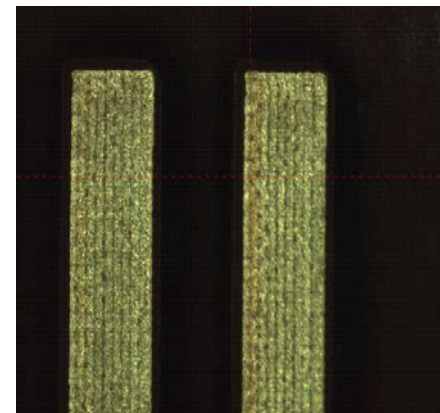
PC SCRIBING Ag
over Copper –
200 nm thick



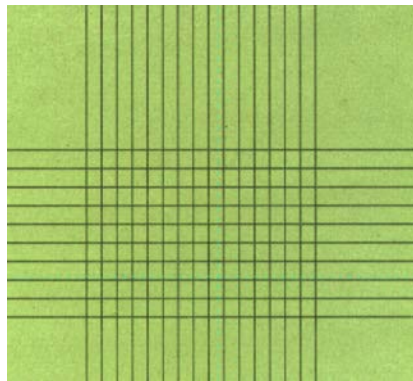
Matrix of 5 μm x 5 μm
ETCHING of 150 nm Ag
layer on PMMA



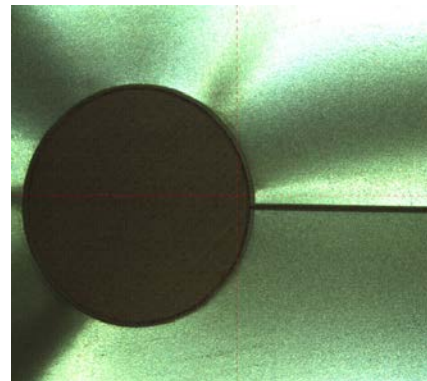
Kapton SCRIBING
over Copper



PC ETCHING
Ag over Copper –
1 μm thick



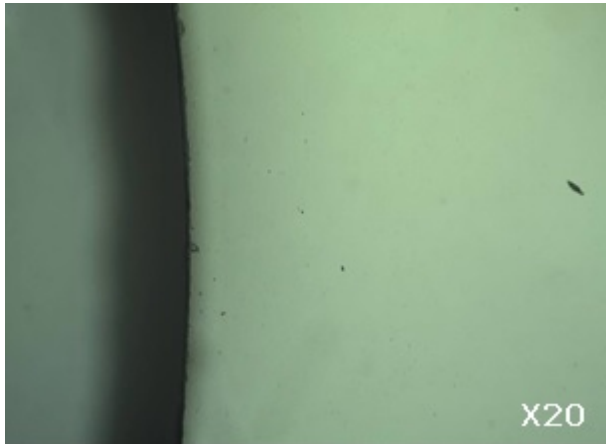
Ag ETCHING
over Copper –
3 μm thick



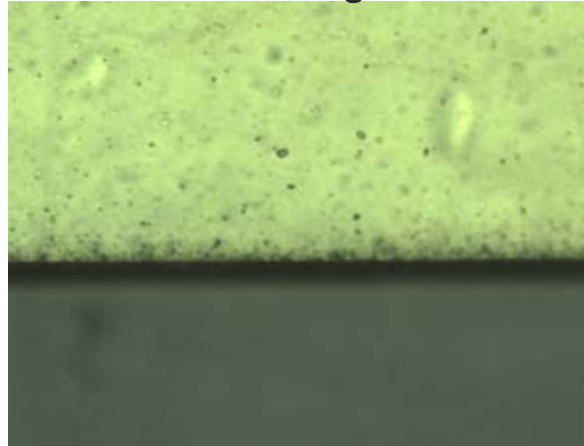
Processed with SIRIUS

APPLICATIONS – CONSUMER ELECTRONICS 2/2

500 μm thick Asahi Corning glass



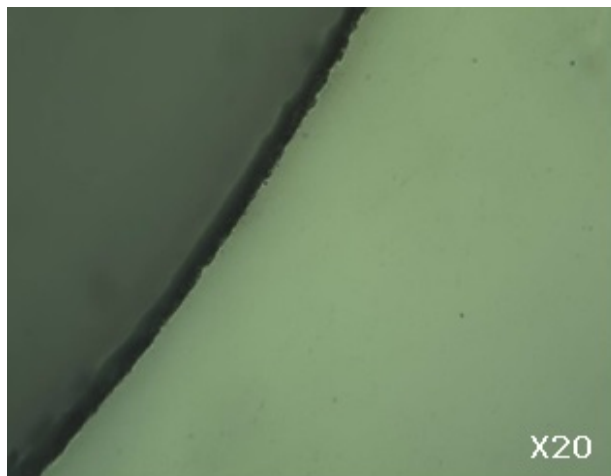
200 μm thick Polyimide cutting



Inner glass white marking



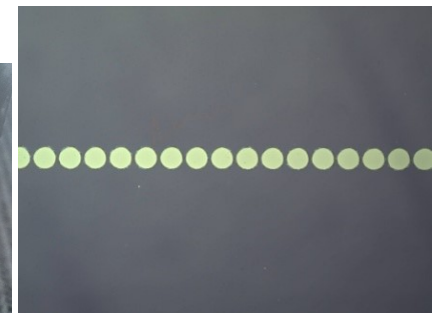
175 μm thick coverglass cutting



Surface grating on polished SS



ITO patterning



Processed with SIRIUS