Laser processing for PV

Department of Information Engineering, University of Padova
Luxor Laboratories, Via Trasea 7, Padova, Italy

Prof. Paolo Villoresi
Giuseppe Vallone
Alberto Gurizzan
Alberto Giacomin
Elisa Appi

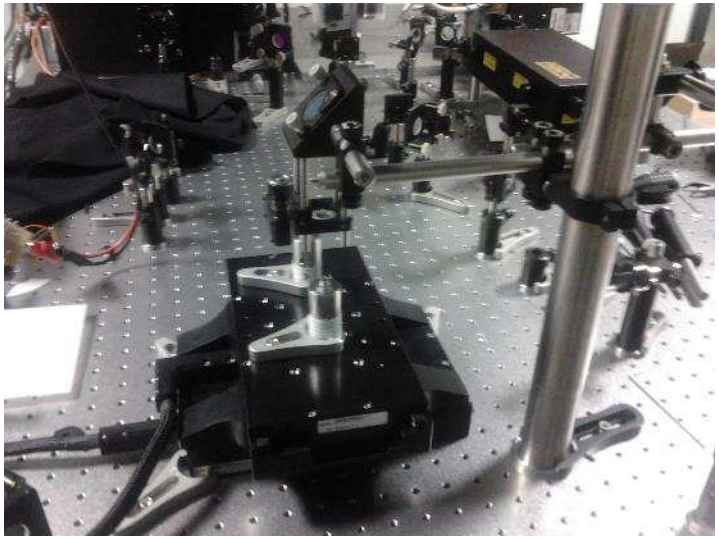
paolo.villoresi@dei.unipd.it

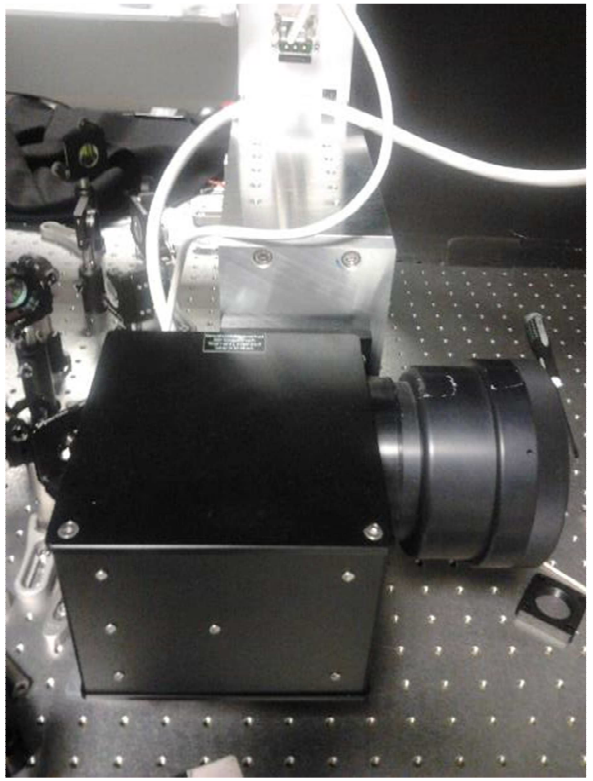
Experimental setup: laser source

Yb:KGW femtosecond laser Pharos (LightConversion), 1028 nm.

- 12 W average power
- <200 fs pulse duration **up to 10 ps**
- Pulse energy max: 1 mJ
- 1kHz up to 1 MHz repetition rate
- Harmonic generation (HIRO system): II, III, IV

Beam delivery





Selective ultrafast laser dielectric delamination (Collab. Applied Materials Italia)

In the fabrication of a silicon PV solar cell certain step processes involve direct material ablation.

Realization of openings in the dielectric layer for contact deposition

Edge insulation

It has been sperimentally proven that it's possible to use sub-picosecond pulses with photon energies above the silicon bandgap to selectively delaminate the dielectric layer without noticeable damage to the opened surface. **Therefore the need for a model able to predict the interaction between ultrashort pulses and matter.**