Permanent growth of the thin-film electronics market stimulates the development of versatile technologies for large scale patterning of thin-film materials on rigid and flexible substrates. Efficiency of the thin-film solar cells with a large active area might be maintained if small segments are interconnected in series in order to reduce photocurrent in thin films and resistance losses. Laser scribing is an important step to preserve high efficiency of photovoltaic devices on large areas. The picosecond laser Atlantic was used to scribe the thin-film layers in ZnO/InGaN/ZnO/less solar cells. The laser beam was focused through the glass substrate to the solar cells layers as shown in picture below.

The picosecond laser Atlantic was used to scribe the thin-film layers in CIGS solar cells with the top contact made of ITO and ZnO. Irradiation with the 355 nm laser radiation has shown better results due to selective energy coupling. Selectivity of the laser ablation with the 355 nm radiation, grain of CuInGaSe2 on a polymer substrate, and building-integrated applications.

The laser radiation was coupled at the corresponding wavelength of the laser radiation at 266 nm for “cold” ablation. The round and hexagonal parts cut out from the PL10100 laser radiation at 266 nm includes:

- Metals
- Composites and resins
- Semiconductors
- Diamond
- Sapphire
- Ceramic
- Glass
- Polymers

The main limiting factor to nanosecond laser processing of the multilayer CIGS structures is deposition of molybdenum on walls of channels scribed in the films, and the phase transition of CIGS to metallic state close to the ablation area due to the thermal effect. Both effects create shunts in the photovoltaic device and reduce its conversion efficiency. Thermal degradation of the CIGS solar cells starts at temperatures above 100 °C. The processing without damage is possible with ultra-short pulse lasers.