

State of the art femtosecond laser technology for the industry enabling advanced processing and higher throughput

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The way femtosecond lasers are used has changed over the years and with this, the way femtosecond lasers are manufactured. Nowadays femtosecond lasers are well established reliable tools in the industry and the expectations of the ability of these lasers has also grown.

As a response, laser manufacturers adapted the architecture of the laser to the usage and the process, to allow easy integration of the lasers and faster processing.

As throughput requirements grow, high power femtosecond lasers are becoming the new standard in the industry, opening doors to other markets and applications. Driven by the biggest players in the display market, the development of >100 Watt femtosecond laser in infrared, has given access to high power femtosecond laser UV. But the increase in power is not the only development on femtosecond lasers that makes advance processing possible. Current architectures allow users to freely select pulses from the oscillator and to change the repetition rate of the laser during the process, while maintaining the energy per pulse constant. The key advantage of this pulse on demand up to 40MHz function, is the exploitation of acceleration and deceleration phases of the scanner, keeping the distance between two consecutive pulses on the sample the same. Another strategy to increase the throughput is to increase operate in the GHz regime. When operating in the kHz regime, the residual heat will mostly dissipate in the time between two consecutive pulses, but in the GHz regime this is not the case. Therefore, the consecutive pulse incidents on a heated surface and due to the heat, that remained in the material, the ablation threshold decreases.

Where in the past, developments have pushed the technology to a higher level, current development will push the industry to a higher level.