The kW-flexiburst project: programmable GHz bursts for optimal ultrafast laser materials processing

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The next generation of laser technologies need to deliver an extreme flexibility. Current ultrafast laser technology has enabled high precision micromachining, but existing laser sources are not flexible enough to consistently work in the optimal ablation regime while using all of the available power. The kW-flexiburst project develops a breakthrough laser technology to overcome this critical barrier, and enable next generation manufacturing in a range of industrial sectors.

The laser is based on a radically new concept of oscillator, generating bursts in the GHz regime, that can be arbitrarily adjusted in terms of burst repetition rate, intra-burst repetition rate, number of pulses per burst. Efficient amplification has boosted the average power to reach 1 kW. After a brief description of the laser architecture concepts and results, we will present recent results, at 10 W average power, comparing widely different ablation regimes of GHz bursts for laser micromachining.

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