

## **Ultrafast Laser Ablation – Overview of Processing Characteristics**

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Guidelines for optimizing laser and process parameters for ultrafast laser ablation will be presented based on the results of a detailed laser-material interaction study that included measuring ablation rates, heat affected zones and surface roughness for 25 different materials. This investigation was performed as a function of pulse duration (400 fs – 18 ps), pulse fluence, and laser wavelength using a 40 W modelocked, 1035 nm Yb Fiber MOPA with additional extra-cavity frequency doubling and frequency tripling stages. The data indicate that for ablative material processing of metals, semiconductors and plastic materials, operation near an optimum pulse fluence of about 1 J/cm<sup>2</sup> leads to maximum ablation rates while minimizing the heat affected zone. The effect of burst mode operation on ablation rate and processing quality will be reviewed.