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Evolution of electrical fields generated during interaction of high intensity laser with structured targets

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Interaction of high-intensity laser pulses with solid targets results in generation of large quantities of energetic electrons that are the origin of various effects such as intense x-ray emission, ion acceleration,etc
Our, recent measurements related to the field enhancement conducted on FLAME laser will be presented. We realized a spatially - resolved Electro Optical Sampling by using a crystal and a laser-probe. Such solution allows monitoring temporal profile (with resolution < 100 fsec) in a single-shot way. We retrieved the bunch Coulomb electric field, allowing retrieving the temporal profile and the quantity of the escaped electrons and demonstrated the field enhancement process by structured targets. In the case of the planar foil target, the signal shows the presence of a first emitted bunch with charge ~1. 2 nC Laser interaction with the tip target produced a much larger number of released electrons.We report, for the first time, a novel femtosecond-resolved experimental study of the fields generated by the interaction. Our results reveal the temporal evolution of large fields, up to 0.6 TV/m, that generated close to the target.. Such a picture represents a new step toward the understanding of the interaction mechanism.

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