

HIGH REPETITION RATE P-P LASER AS A TOOL FOR HIGH-CONDUCTIVITY CHANNEL CREATION

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Many laboratories of the world still continue the search for producing a high-conductivity channel in the atmosphere, capable of conducting a short-circuit current in a natural or artificial electrical circuit. Authors of demonstrated a 1.5-fold increase in the length of the discharge gap broken under laser irradiation when switching extended (~1 m) high-voltage (up to 390 kV) electric discharges by 100-ns UV pulses of a KrF laser. Laser-based lightning protection systems, as is known, rely on the so-called long laser spark, which provides the conditions for connecting a thunderstorm cloud with a grounded metal rod, i.e., a classical lightning rod. Maximum lengths (~16m) of the laser-spark-controlled electric discharge at a voltage of 3 mV were obtained in Russia and Japan using a 0.5 kJ pulsed CO₂ laser with spherical optics. The Impulsar program had been focused on the high conductivity channel development with orbital scale in the length. Such a high conductivity channels can be used in energy transmission, overvoltage protection systems, transport of charged particle beams, plasma antennas, etc.

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