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Terahertz radiation in an ultrashort-laser-induced discharge plasma in air TAKESHI HIGASHIGUCHI, HIROAKI KASHIWAZAKI, AKINORI SUZUKI, TAKAMITSU OTSUKA, NOBORU YUGAMI, Utsunomiya University — Radiation sources in the microwave to terahertz (THz) spectral region are of great interest, because of their potential applications as diagnostics to study properties of dielectric materials as well as ultrafast chemical and biological processes. Plasma-based radiation sources have the advantage of being frequency tunable, and of producing an ultrashort, high-power pulse without breakdown. We have demonstrated that the terahertz radiation can be generate by the burst current produced by a laser created ionization front, which is induced an optical-field-induced ionization (OFI) in air with a pulsed electric field. The peak frequency of the radiation spectrum depends on the rise time of the OFI. The central frequencies of the radiation are observed to be 0.2 and 0.04 THz at the pulse durations of 50 and 300 fs (FWHM), respectively. The power of the linearly polarized THz radiation is linearly increased with the square of the electrostatic field strength applied to the capacitors.

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