

Compact continuous wave THz source based on monolithic two-color laser diode

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Abstract

We report a stable and compact CW THz source, based on fiber coupled photoconducting antennas pumped with monolithically integrated dual mode distributed Bragg reflector semiconductor laser diode (DBR LD). Two DBR lasers are monolithically integrated on single substrate with a Y-shaped waveguide structure and made to emit two wavelengths simultaneously at 785nm center wavelength, with stable spectral wavelength difference of 0.6 nm. Ion implanted GaAs log spiral antennas are used to generate and detect THz radiation in homodyne set up. The detected THz frequency corresponds well to the value obtained for the optical beat frequency of the two modes. We analyze the use of this system for simple THz non-destructive testing applications like moisture measurement on leaves and different papers. The results obtained demonstrate the feasibility of a compact, simple, and cost-efficient CW THz system which could gain application in industrial non-destructive testing measurements.