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Title:Phase-coherent heterodyne detection in the terahertz regime with a photomixer

Authors:Constantin, Florin Lucian (1)

Author affiliation:(1) Centre National de la Recherche Scientifique at Laboratoire PhLAM, F-59655 Villeneuve d'Ascq, France

Corresponding author:Constantin, F.L.(fconstan@phlam.univ-lille1.fr)

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Abstract:A low-temperature-grown GaAs photomixer with a spiral antenna has a quadratic response to the optical fields and an intrinsic nonlinear IV characteristic that allow the detection of THz radiation. A transmission line coupled to the antenna provides the photomixer with direct-current access in the microwave domain. The non-ohmic response of the photomixer is probed by rectification. The optical beat between two continuous-wave lasers illuminating the photomixer serves as a local oscillator with an adjustable difference-frequency in the THz domain. The beat between a THz field modulated at a radiofrequency rate with a radiofrequency-modulated optical beat is exploited in a phase-sensitive detection scheme.

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