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Title

Non-linear optoelectronic phase-locked loop for stabilization of opto-millimeter waves: towards a narrow linewidth tunable THz source

Source

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Abstract

We propose an optoelectronic phase-locked loop concept which enables to stabilize optical beat notes at high frequencies in the mm-wave domain. It relies on the use of a nonlinear-response Mach-Zehnder modulator. This concept is demonstrated at 100 GHz using a two-axis dual-frequency laser turned into a voltage controlled oscillator by means of an intracavity electrooptic crystal. A relative frequency stability better than 10^{-11} is reported. This approach of optoelectronic down conversion opens the way to the realization of continuously tunable ultra-narrow linewidth THz radiation.