

13

Accession number:20114114413462

Title:Widely tunable THz synthesizer

Authors:Hindle, F. (1); Mouret, G. (1); Eliet, S. (1); Guinet, M. (1); Cuisset, A. (1); Bocquet, R. (1); Yasui, T. (3); Rovera, D. (4)

Author affiliation:(1) Universite Lille Nord de France, Lille 59000, France; (2) Laboratoire de Physico-Chimie de l'Atmosphère, EA 4493, ULCO, Dunkerque 59140, France; (3) Institute of Technology and Science, University of Tokushima, Tokushima, Japan; (4) Observatoire de Paris, Systèmes de Référence Temps-Espace UMR CNRS 8630, 61 avenue de l'Observatoire, Paris 75014, France

Corresponding author:Hindle, F.(francis.hindle@univ-littoral.fr)

Source title:Applied Physics B: Lasers and Optics

Abbreviated source title:Appl Phys B

Volume:104

Issue:4

Issue date:September 2011

Publication year:2011

Pages:763-768

Language:English

ISSN:09462171

CODEN:APBOEM

Document type:Journal article (JA)

Publisher:Springer Verlag, Tiergartenstrasse 17, Heidelberg, D-69121, Germany

Abstract:The generation of cw-THz radiation by photomixing is particularly suited to the high resolution spectroscopy of gases; nevertheless, until recently, it has suffered from a lack of frequency metrology. Frequency combs are a powerful tool that can transfer microwave frequency standards to optical frequencies and a single comb has permitted accurate (10^{-8}) THz frequency synthesis with a limited tuning range. A THz synthesizer composed of three extended cavity laser diodes phase locked to a frequency comb has been constructed and its utility for high resolution gas phase spectroscopy demonstrated. The third laser diode allows a larger tuning range of up to 300 MHz to be achieved without the need for large frequency excursions, while the frequency comb provides a versatile link to be established from any traceable microwave frequency standard. The use of a single frequency comb as a reference for all of the cw-lasers eliminates the dependency of synthesized frequency on the carrier envelope offset frequency. This greatly simplifies the frequency comb stabilization requirements and leads to a reduced instrument complexity.

Number of references:13