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Author

Yah Leng Lim. Dean P. Nikolic' M. Kliese R. Khanna SP. Lachab M. Valavanis A. Indjin D. Ikonic' Z. Harrison P. Linfield EH. Davies AG. Wilson SJ. Rakic' AD.

Author Unabbreviated

Dean Paul; Nikolic' Milan; Kliese Russell; Khanna Suraj P.; Lachab Mohammad; Valavanis Alex; Indjin Dragan; Ikonic' Zoran; Harrison Paul; Linfield Edmund H.; Davies A. Giles; Wilson Stephen J.; Rakic' Aleksandar D.

Author/Editor Affiliation

Yah Leng Lim. Nikolic' M. Kliese R. Wilson SJ. Rakic' AD. : School of Information Technology and Electrical Engineering, University of Queensland, St. Lucia, QLD 4072, Australia

Dean P. Khanna SP. Lachab M. Valavanis A. Indjin D. Ikonic' Z. Harrison P. Linfield EH. Davies AG. : School of Electronic and Electrical Engineering, University of Leeds, Leeds LS2 9JT, UK

Title

Demonstration of a self-mixing displacement sensor based on terahertz quantum cascade lasers

Source

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Abstract

There has been growing interest in the use of terahertz (THz) quantum cascade lasers (QCLs) for sensing applications. However, the lack of compact and sensitive THz detectors has limited the potential for commercial exploitation of sensors based on these devices. We have developed a self-mixing sensing technique in which THz QCLs are used for both generation and interferometric sensing of THz radiation, eliminating the need for a separate detector. Using this technique, we have measured the displacement of a remote target, both with and without opaque (in the visible spectrum) materials in the beam path and demonstrated a stand-off distance of up to 7 m in air. (13 References).