

The Review of Laser Engineering

THE LASER SOCIETY OF JAPAN

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ONLINE ISSN : 1349-6603

PRINT ISSN : 0387-0200

The Review of Laser Engineering

Vol. 31 (2003) , No. 7 p.458

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Millimeter-Wave Photonic Oscillator Using a Fast Photodiode

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(Received: April 10, 2003)

Abstract: A waveguide-mounted photonic mixer employing a Uni-Traveling-Carrier Photodiode (UTC-PD), which is optically-pumped by two 1.55 μm lasers, has been built and tested as a millimeter-wave oscillator in the 75-115 GHz band. We have successfully demonstrated that the photonic mixer can produce an output power as high as ~ 2 mW at 100 GHz with an input laser power of ~ 100 mW. It is shown that the photonic mixer can provide a sufficient power required to pump an SIS mixer and that amplitude noise of the photonic mixer is as low as that of the Gunn diode in the 100 GHz band. This indicates that the photonic mixer is a promising candidate for a local oscillator source of a SIS mixer at millimeter and submillimeter wavelengths.

Key Words: [Millimeter wave](#), [Photodiode](#), [Local oscillator](#), [SIS mixer](#), [Noise temperature](#)

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To cite this article:

Takashi NOGUCHI, Akitoshi UEDA, Yutaro SEKIMOTO, Masato ISHIGURO, Hiroshi ITO and Tadao NAGATSUMA: The Review of Laser Engineering, Vol. **31**, (2003) p.458 .

doi:10.2184/lcj.31.458

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