

# X-Band Tunable Microwave Generator

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**A simple, tunable microwave generator with wider ranges of frequencies to improve radio, radar, and satellite technologies.**

Georgia Tech inventors and other researchers have developed a simple, tunable microwave generator whose frequency is tunable across a wider band of frequencies. This is done via a different laser architecture where a larger range can be easily demonstrated. The technology then forces the optical output of the laser back into the laser itself using a mirror, which is placed in front of the laser beam, and undamps the characteristic frequency of the laser diode. All in all, the device should be accurately temperature and current controlled.

## Summary Bullets

- **Simpler** – consists of a single laser diode, a mirror, a feedback attenuator, photodiode, and inter-connects between the devices
- **Cheaper** – does not require expensive external RF sources or laser sources
- **Accessible** – does not require any exotic components that cannot be purchased from a component manufacturer

## Solution Advantages

- **Simpler** – consists of a single laser diode, a mirror, a feedback attenuator, photodiode, and inter-connects between the devices
- **Cheaper** – does not require expensive external RF sources or laser sources
- **Accessible** – does not require any exotic components that cannot be purchased from a component manufacturer
- **Robust** – ability to tune frequencies across the X-band frequency range

## Potential Commercial Applications

- Radar/telecom carriers
- Satellite/microwave communications
- Radio-frequency clocking
- Radio-transmission over fiber

## Background and More Information

Since the first demonstrations of optoelectronic oscillators (OEO) as highly stable radio-frequency (RF) sources, they have continually grown in popularity due to their many applications in radar and communications, as well as in sensing and measurement. OEOs are part of a broader class of photonic and optoelectronic devices that have been utilized to generate microwave-modulated optical signals. Techniques that involve modulating the injection current or the optical output themselves require microwave sources, and suffer from noise and tunability issues associated with such sources.

## **Inventors**

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- Dr. Alexandre Locquet  
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- Michael Wishon  
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## **IP Status**

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## **Publications**

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## **Images**

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<https://s3.sandbox.research.gatech.edu//index.php/print/pdf/node/3436>