

X-Band Tunable Microwave Generator

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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IP Status

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Publications

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