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Wideband Microwave and Millimeter Wave Filters via Hyperfine Photonic Spectral Filtering

A novel photonic method optimizes radio receiver performance by providing ultra-wideband microwave-millimeter wave filtering for applications like pulsed radar, radio frequency sensing, and electronic countermeasures.

Photonic solutions for microwave filters offer substantial advantages over electronic implementations, such as wider operating bandwidth and immunity to electromagnetic interference. Although photonic processing of microwave signals has been explored, previous reported approaches have limited filtering functions including low spectral range of several gigahertz, non-flat-topped, high side lobes, high complexity, and limited reconfigurability.

Purdue University researchers have developed a novel method to filter wideband microwave-millimeter wave signals in the optical spectrum. This technology optimizes the performance of a radio receiver. This method enables filter and waveform generation technology for radio frequency applications such as pulsed radar, radio frequency sensing, and electronic countermeasures.

Advantages:

-Provides user-specified microwave-millimeter wave filtering over an ultra-wideband

-Enables filter and waveform generation technology for radio frequency applications

Potential Applications:

-Optics

-Radial Technology

TRL: 5

Technology ID
64589

Category
Aerospace & Defense/Defense Electronics & Surveillance Technologies
Computing/Photonic & Optical Computing Technologies

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Keywords: Photonic solutions for microwave filters, electronic implementations, wide operating bandwidth, immunity to electromagnetic interference, photonic processing of microwave signals, wideband microwave-millimeter wave signals, optical spectrum filtering, radio receiver optimization, filter and waveform generation technology, radio frequency applications, Electrical Engineering, Lasers, Microwaves, Optics, Radio Receiver, Spectral Range, Wave Signals