Dual-wavelength generation with terahertz spacing using GaAs–AlGaAs microring resonator waveguides

ABSTRACT

In this research, we present the demonstration of GaAs–AlGaAs waveguide resonators. Two microring resonators (MRRs) have the same radius of 6.36 μm are coupled and used to generate dual-wavelength with terahertz (THz) spacing. We have shown that such resonators can be used to generate ultra-wide free spectral range (FSR) pulses with THz spacing, providing THz photonics communication signals. A Gaussian laser beam with power of 1 W is used as input. The MRRs are modeled by using GaAs–AlGaAs with GaAs core having refractive index of 3.368 surrounded by AlGaAs (n = 3.135). The drop port outputs of the MRRs system contains a dual-wavelength generated within 33 nm wavelength range, having a linewidth of 1.48 (185.320 GHz) and FSR of 3.95 nm (500 GHz) which varies slightly along the wavelength. Results were generated using the time-domain travelling wave (TDTW) method and capable of modeling both active and passive photonic circuits.

Keyword: Dual-wavelength; GaAs–AlGaAs waveguide; THz spacing