## 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  $\mu$ m 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