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NUMERICAL SIMULATION OF ENHANCED OPTICAL FREE SPECTRAL RANGE THROUGH INTEGRATED FANO-MICRORING CONFIGURATION

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Abstract
A numerical analysis of the integrated Fano-microring (IFM) racetrack resonator spectrum was performed to investigate the enhancement of the optical system's free spectral range (FSR). The FSR is an important optical property which can contribute to the high sensitivity of optical devices. The IFM refers to the combination of Fano resonance produced in the output spectrum through the interaction of Fabry–Perot resonance and circulation resonance. This work focuses on the study of inducing Fano resonance in the microring resonator to optimize the FSR of the system. The results show that the integration of two resonances can produce a Vernier output spectrum, which significantly enhanced the FSR of the system without any need for additional ring waveguides. This work also compared the IFM resonance with the conventional microring resonance. In this simulation, the optimized FSR obtained by the IFM configuration was 266.55 nm, which is five times higher than the conventional microring configuration.

Author Keywords
: Fano resonance; fabry-perot resonance; free spectral range; microring; numerical simulation

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