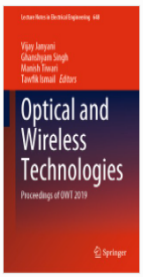

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Dual-Band Plasmonic Filter Using Nanoslit-Loaded Ring Resonator

Yazusha Sharma, Rukhsar Zafar, Ravi Jangir, Ghanshyam Singh and Mohammad Salim

Abstract Plasmonics plays a key role in dealing with the demerit of the diffraction limit which is offered by traditional optical-based devices. Here, we have investigated a simple plasmonic dual-band optical filter that operates on desired optical band. The filter is based on metal-dielectric-metal (MDM) waveguide in order to facilitate sub-wavelength confinement. The MDM waveguide is coupled to nanoslit-loaded ring resonator. The presence of nanoslit excites the special mode in the resonance spectrum, known to be Fano modes, and by varying the position of slit, resonance can be tuned accordingly.

Keywords Plasmonics · Dual-band filter · Metal-dielectric-metal (MDM) · Sub-wavelength confinement

1 Introduction

In optical communication system, several transmission bands are defined and standardized by IEEE or ITU to support different applications. The E band is typically avoided to curtail the effect of large transmission losses. E band shows high absorption peak for water content. Wavelength-division multiplexing technique is being used by several applications to carry multiple wavelengths in order to enhance the bandwidth. In the current era of optical network, S, C and L bands are being used thoroughly due to their properties of inhabiting low optical losses in glass fiber [1]. Therefore, most of the optical devices or networks are designed to operate in this desired band. The optical fiber possesses the tremendous advantage of transferring the signal worldwide with extreme speed, but the transmitter and receiver end of optical communication unit is prone to O-E-O conversion [2, 3]. This conversion is the stumbling block in high-speed optical communication system because data

Y. Sharma (✉) · R. Zafar · R. Jangir
Department of Electronics and Communication Engineering, Swami Keshvanand Institute of Technology, Management and Gramothan, Jaipur, India

G. Singh · M. Salim
Department of Electronics and Communication Engineering, Malaviya National Institute of Technology, Jaipur, India

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