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Title: Lossy Mode Resonance (LMR) Based Fiber Optic Sensors

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Abstract:

Fiber optic (FO) sensing technology has been very popular in the past few decades with its promising benefits. One of the important reasons for the increased demand for FO sensors is their pure dielectric nature due to which these can be effortlessly used in many perilous areas where conventional sensors may not work effectively. Since last few decades several techniques such as interferometry, evanescent wave absorption (EWA), photoluminescence (PL), fiber Bragg grating (FBG) and surface plasmon resonance (SPR) have been used for sensing applications. Among all the FO sensing techniques, SPR based sensors have received much attention in last two decades. Generally, three types of electromagnetic resonances can be realized depending on properties of the various thin film materials, viz., SPR, LMR and long range surface plasmon polariton.

LMR phenomenon is a new and emerging field of research for FO sensing applications. A major advantage of LMR based sensors over the well established SPR based sensors is their ability to work independently of the specific polarization of light. Also, unlike evanescent wave and SPR based sensors, the sensitivity of these LMR sensors does not get affected by the geometrical parameters of fiber and primarily depends on the thickness of thin film material. In addition to sensing, LMR phenomenon can also be utilized as wavelength filters for communication purposes. This paper presents the theory and major advancements in the field of LMR based sensors for various applications ranging from physical sensing to biosensing . Finally, future scope of research in the LMR sensing technology is suggested.

Key words: Lossy Mode Resonance, Surface Plasmon Resonance, Thin Films, Fiber Optic Sensors, Fiber Bragg grating, Wavelength filters, Evanescent wave absorption

Biography:

Nidhi Paliwal has completed her PhD form Indian Institute of Technology Bombay (IITB), Mumbai, India, in 2017. Currently she is Research Associate in department of Electrical Engineering at IITB, a premier technical institution in India. She received her M.Tech. degree in applied optics from Indian Institute of Technology Delhi, New Delhi, India, in 2009. She received the M.S. degree in physics from C.C.S. University, Meerut, India in 2005. From 2009 to 2011, she was a Project Assistant at National Physical Laboratory (NPL), New Delhi, India. Her research interests include design, fabrication and characterization of surface plasmon resonance (SPR) and lossy mode resonance (LMR) optical fiber sensors for practical sensing applications.

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