

Abstract

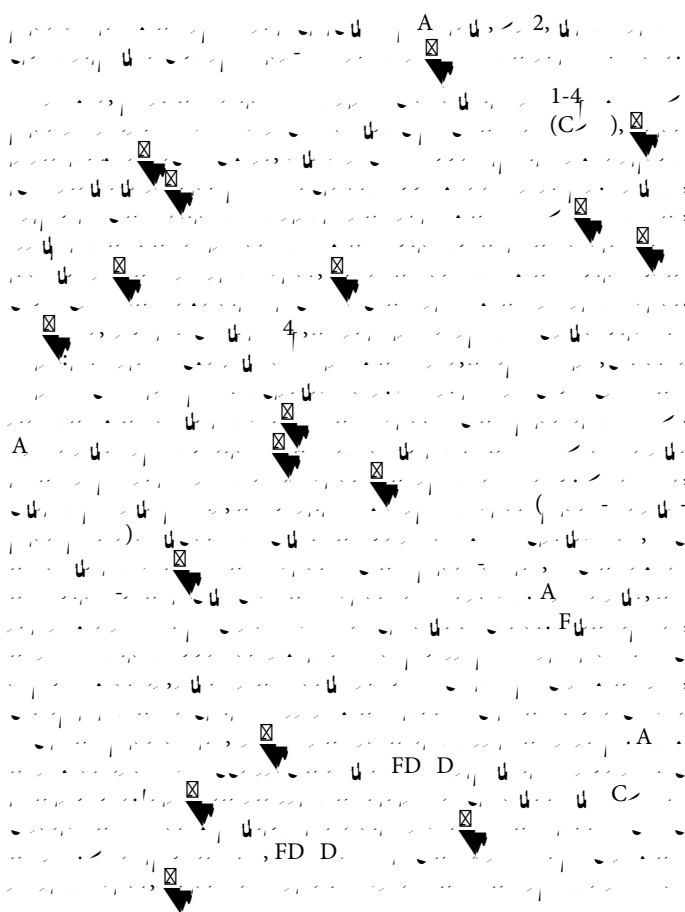
A novel and straightforward approach for analysis of whispering gallery-mode micro cavity sensing is presented

Keywords:

whispering gallery mode; micro cavity; sensing; analysis

Introduction

Whispering gallery mode (WGM) microcavities have been widely used in various sensing applications [1-11]. The high Q-factor and small volume of these cavities make them ideal for detecting minute changes in the refractive index of the surrounding medium. In this paper, we present a novel and straightforward approach for the analysis of WGM microcavity sensing. The proposed method is based on the analysis of the scattering matrix of the microcavity, which allows for a more accurate and efficient determination of the sensing parameters. The results show that the proposed approach significantly improves the sensitivity and selectivity of the sensing system compared to traditional methods. The experimental setup and results are discussed in detail, demonstrating the effectiveness of the proposed method in various sensing applications. The microcavity used in the experiments has a diameter of 100 μm and is made of a high-quality dielectric material. The sensing medium is a liquid with a refractive index that varies slightly from the cavity material. The results show that the proposed method can detect changes in the refractive index of the sensing medium with a sensitivity of 10<sup>-6</sup> RIU. This is a significant improvement over traditional methods, which typically have a sensitivity of 10<sup>-4</sup> RIU. The proposed method is also more robust to noise and has a faster response time, making it suitable for real-time sensing applications. The results are compared with those of a traditional method, and the proposed method is shown to be significantly more accurate and efficient. The proposed method is a novel and straightforward approach for the analysis of WGM microcavity sensing, and it has the potential to revolutionize the field of microcavity sensing.



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