

عنوان مقاله:

Designing a high resolution optical displacement sensor based on Electromagnetically Induced Transparency (EIT) in rectangular resonator

محل انتشار:

دومین کنفرانس بین المللی و سومین همایش ملی کاربرد فناوری های نوین در علوم مهندسی (سال: 1394)

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خلاصه مقاله:

An ultra-high resolution all-optical sensor is designed at the present article applying rectangular resonator and Electromagnetically Induced Transparency (EIT). To accomplish the purpose, the mathematical modeling and performance of the rectangular resonator was illustrated and optical parameters were extracted considering a slab doped with three-level atomic system quantum dots. The density matrix formula was used to evaluate the proposed structure. Here, the optic acceptance coefficient is calculated then the acceptance coefficient is controlled by the control field. The obtained acceptance coefficient is applied for the output light intensity. The purpose is to obtain an ultra-narrow characteristic to measure very small intervals. In this resonator; changing the width of the L gap leads to a change in wave length and consequently; the output light intensity is changed. The rectangular resonator array is used as the main cell to measure various physical quantities, such as displacement, and the proposed structured is thoroughly investigated by various quantities changes for the impact on the sensor resolution. The results show that the proposed optical displacement sensor can easily detect below the nanometer range.

کلمات کلیدی:

rectangular resonator, optical displacement sensor, electromagnetically induced transparency, optical switch

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