

Abstract Submitted
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Nanometer scale discrimination of mechanical vibrations with a multiple reflections planar glass system¹ RUGGERO MICHELETTO, KATSUMI HAMAMOTO, YOICHI KAWAKAMI, Kyoto University, Graduate School of Engineering, Department of Electronic Science, Nishigyo-ku, Katsura, 615-8510 Kyoto, Japan — An optical vibration sensor is useful where electrical signals cannot be used or are impractical. Also, purely optical vibration sensors have minimal mechanical influence, so they are important for the detection of tiny displacements at a wide range of frequencies. We realized an optical waveguide system to detect in a simple and low-cost manner nanometer scale mechanical vibrations. The system is based on a planar glass waveguide, laser light is internally reflected multiple times in critical angle conditions. Monitoring the light at the exit of the device, results in sensitivity to small angular displacements due to mechanical vibrations. We could demonstrate very high sensitivity; tiny vibrations of 12nm were resolved, this correspond to an angular shift of about $50 * 10^{-6}$ deg.

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