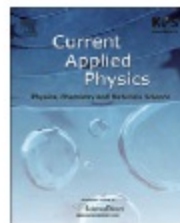




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## Detection sensitivity of the optical beam deflection method characterized with the optical spot size on the detector

Eun Joong Lee, Youngok Park, Chul Sung Kim, Taejoon Kouh \*

*Department of Physics, Kookmin University, Seoul 136-702, Republic of Korea*

### ARTICLE INFO

*Article history:*

Received 3 July 2009

Accepted 6 October 2009

Available online 12 October 2009

*Keywords:*

Optical beam deflection

Displacement detection sensitivity

Optical spot size

### ABSTRACT

Here we describe the effect of the incident optical spot size upon the quadrant photodetector on the displacement detection sensitivity of the optical beam deflection method. By varying the size of the beam spot reaching the photodetector and measuring the optical responsivity, we have determined the optical detection sensitivity as a function of the optical spot size on the photodetector. Also, we have calculated the numerical value of the detection sensitivity with the Gaussian optical spot profile and compared with the experimental data. Both experimental and analytic studies show that the optical displacement detection sensitivity increases with the decrease in the width of the Gaussian optical spot. The study presented here will be beneficial in developing the nanomechanical displacement detection techniques based on the beam deflection method with a position-sensitive detector.