

The Response of Optical Properties to Temperature in Three-Layer Micro Device Under Influence of Casimir Force

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Abstract : Here, we investigate the sensitivity the Casimir force and consequently dynamical actuation of a three-layer microswitch to some ambient conditions. In fact, we have considered the effect of optical properties on the stable operation of the microswitch for both good (e.g. metals) and poor conductors via a three layer Casimir oscillator. Indeed, gold (Au) has been chosen as a good conductor which is widely used for Casimir force measurements, and highly doped conductive silicon carbide (SiC) has been considered as a poor conductor which is a promising material for device operating under harsh environments. Also, the intervening stratum is considered ethanol or water. It is also supposed that the microswitches are frictionless and autonomous. Using reduction factor diagrams and bifurcation curves, it has been shown how performance of the microswitches is sensitive to temperature and intervening stratum, moreover it is investigated how the conductivity of the components can affect this sensitivity.

Keywords : Casimir force, optical properties, Lifshitz theory, dielectric function

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