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Measurement of Casimir force with transparent conducting oxides ALEXANDR BANISHEV, CHIA-CHENG CHANG, UMAR MOHIDEEN — The Casimir force plays an important role in micro- and nano electro mechanical systems (MEMS and NEMS) fabrication, because it can easily exceed the electrostatic forces used for actuating the systems at small electrode separation distances. The reduction of the Casimir force in devices is a complicated problem that needs to be scientifically investigated to open opportunities for the full exploitation of MEMS and NEMS technology. One of the ways to tune the Casimir force is to properly choose the materials of which the interacting surfaces are made. According to the Lifshitz theory, the interaction between two objects depends on their dielectric permittivity. In that case the transparent dielectrics attract less than reflective materials. This can be used to decrease the Casimir force when the design requires a smaller short range interaction. To achieve low Casimir forces and avoid uncontrolled electrostatic forces as present in dielectrics, transparent but conductive materials can be used. An ideal choice is conductive Indium Oxide such as very low doped Indium Tin Oxide (ITO). In this report we present the results of the Casimir force using transparent electrodes such as Indium Tin Oxide coated SiO_2 plate.

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