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Anomalous Casimir effect in axion electrodynamics

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The Casimir effect is relevant for QCD physics in many contexts such as a possible origin of the dark energy, an extra pressure in the hadron bag model etc. In this talk we delve into the Casimir effect in (3+1)-dimensional Maxwell-Chern-Simons (MCS) theory aka axion electrodynamics. It is known that two bodies with reflection symmetry always have an attractive Casimir force, but this “no-go theorem” has been challenged recently. We demonstrate that a spatially inhomogeneous topological θ angle induces a repulsive Casimir force. This is a detectable effect in the topological insulator for which axion electrodynamics is the effective theory.

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