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The Topological Casimir Effect MOOS VAN CASPEL, CHARLES CAO, ARIEL ZHITNITSKY, University of British Columbia — The conventional Casimir effect manifests itself as a quantum-mechanical force between two plates, that arises from the quantization of the electromagnetic field in the enclosed vacuum. In this talk the possibility is discussed of an extra, topological term in the Casimir energy at finite temperatures. This topological Casimir effect emerges due to the nontrivial topological features of the gauge theory and becomes apparent when examining, for example, periodic boundary conditions. Here the extra term is explicitly calculated for the simplest example of such a system: two large plates in the x-y plane, with an integer-valued topological flux in the z-direction. By dimensional reduction, this system is closely related to 2D Maxwell theory, which is well understood. We find that the topological term is extremely small compared to the conventional Casimir energy, but that the effect could possibly be amplified by an external magnetic field.

Moos van Caspel
University of British Columbia

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