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Vacuum Restructuring in Finite Geometries: Nonperturbative Casimir Effects in Lattice Gauge Theories

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The Casimir effect is a quantum phenomenon rooted in the fact that vacuum fluctuations of quantum fields are affected by physical objects and boundaries. As the energy spectrum of vacuum fluctuations depends on distances between (and geometries of) physical bodies, the quantum vacuum exerts a small but experimentally detectable force on neutral objects. Usually, the associated Casimir energy is calculated for free or weakly coupled quantum fields. Recent studies of the Casimir effect in non-perturbative regimes within lattice gauge field theory are reviewed in the present talk. We discuss vacuum restructuring in finite geometries: the influence of the Casimir boundaries on the chiral and deconfining phase transitions and the mass-scales.

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