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*Signatures Of The Quantum Vacuum*

The quantum vacuum is one of the most counter-intuitive concepts of quantum electrodynamics. Whereas the classical vacuum refers to a region of space that is devoid of any particles or fields, its quantum counterpart contains fluctuating electromagnetic fields even in the most idealized case. As predicted by macroscopic quantum electrodynamics, the structure of these virtual photons can be significantly altered by the presence of magnetodielectric bodies or media. The signature of the quantum vacuum is manifest in the interaction of virtual photons with charged matter. To illustrate this, I will discuss Van der Waals and Casimir-Polder forces due to anisotropic photon recoil, the photonic Bose-Einstein condensate as a novel ground state of light; interatomic Coulombic decay; and recent schemes to access the quantum vacuum by means of nonlinear optics.