MP 8: Quantenfeldtheorie II

Time: Thursday 11:50–12:30 Location: SPA SR125

MP 8.1 Thu 11:50 SPA SR125

Un-Casimir effect — •Antonia Micol Frassino[1], Piero Nicolini[1], and Orlando Panella[2] — [1]Frankfurt Institute for Advanced Studies, Ruth-Moufang-Strasse 1, D-60438 Frankfurt am Main, Germany — [2]Istituto Nazionale di Fisica Nucleare, Sezione di Perugia, Via A. Pascoli, I-06123 Perugia, Italy

Following a recent conjecture, there could be a sector of the Standard Model that, although massive, can preserve scale invariance properties. The topic has intersected a huge variety of fields, from astrophysics to neutrino physics, AdS/CFT duality and quantum gravity. Such unlike kind of particles (shortly unparticles) has to be weakly interacting with the rest of the Standard Model.

In this talk we present the un-Casimir effect, namely the study of the Casimir energy related to the presence of an un-particle component in addition to the electromagnetic field contribution. We derive this result by considering modifications of the Feynman propagator in the unparticle sector.

The un-Casimir effect offers a reliable testbed for unparticle physics. We find bounds on the unparticle scale that are independent on the effective coupling constant describing the interaction between the scale invariant sector and ordinary matter.

MP 8.2 Thu 12:10 SPA SR125

Justification of the single-mode approximation for the quantum electrodynamics in a strong electromagnetic field — •Oleg Skoromnik[1] and Iliya Feranchuk[2] — [1]Max Planck Institute for Nuclear Physics, Saupfercheckweg 1, 69117 Heidelberg, Germany — [2]Belarusian State University, 4 Nezavisimisty ave., 220030 Minsk, Belarus

The interaction Hamiltonian of an electron and a quasi-monochromatic pulse of a strong quantized electromagnetic field is examined. Canonical transformations of the field variables are found that allows the division of the system's Hamiltonian on two parts. The first one defines the interaction between an electron and a single collective mode of the field. Parameters of this mode correspond to the central lines of the resonant mode in the pulse. The second part describes the field fluctuations relatively to the collective mode. Estimation of the field intensity is found when the effective single-mode Hamiltonian can be used for the system's description.