# MP 14: Posters (Montag - Donnerstag)

Zeit: Freitag 9:00–9:00 Raum: HS 23

MP 14.1 Fr 9:00 HS 23

**Holographic Schwinger Effect of Dynamic Fields** — Chen Lan[1], •Yi-Fan Wang[2], Huifang Geng[1], and Alexander Andreev[1,3] — [1]ELI-ALPS, ELI-Hu NKft, Dugonics tér 13, H-6720 Szeged, Ungarn — [2]Institut für Theoretische Physik, Universität zu Köln, Zülpicher Straße 77, D-50937 Köln, Deutschland — [3]Saint-Petersburg State University, Ulyanovskaya str. 1, Petrodvorets, Saint-Petersburg 198504, Russland

At strong coupling, the scalar Schwinger effect is studied by the field-theoretical method of worldline instantons for dynamic fields of single-pulse and sinusoidal types. By examining the Wilson loop along the closed instanton path, corrections to the results at weak coupling are discovered. They show that: a) since the additional terms depend on strength of the background field, the Wilson loop becomes non-negligible even in the extreme weak-field limit; and b) a breaking of weak-field condition similar to constant field also happens beyond the critical field. In other words, considerations at strong coupling turn out to be indispensable for strongly dynamic field. Therefore, following Semenoff and Zarembo's proposal, the Schwinger effect at strong coupling is studied with an $\mathcal{N} = 4$ supersymmetric Yang–Mills theory in the Coulomb phase. With the help of the gauge/gravity duality, the vacuum decay rate is evaluated by the string action with instanton worldline as boundary, which is located on a probe D3–brane. The corresponding classical worldsheets are estimated by perturbing the integrable case of a constant field.

MP 14.2 Fr 9:00 HS 23

**Semigroup Approach to the Sign Problem in Quantum Monte Carlo Simulations** — •Zhongchao Wei — University of Cologne, Cologne 50937, Germany

We propose a new framework based on the concept of semigroup to understand the fermion sign problem. By using properties of contraction semigroups, we obtain new sufficient conditions for quantum lattice fermion models to be sign-problem-free. Many previous results can be considered as special cases of our new results. As a direct application of our new results, we construct a new class of sign-problem-free fermion lattice models, which cannot be understood by previous frameworks. This framework also provides an interesting aspect to understanding related quantum many-body systems. We establish a series of inequalities for all the sign-problem-free fermion lattice models that satisfy our sufficient conditions.

MP 14.3 Fr 9:00 HS 23

**Emission & Regeneration - Unified Field Theory.** — •Osvaldo Domann — Stephanstr. 42, D- 85077 Manching

The SM defines for each force a different field resulting the electric, magnetic, weak, strong and gravitation fields. A theory is presented based on a space-like representation of Subatomic Particles (SPs) as Focal Points of rays of Fundamental Particles (FPs) that extend over the whole space. The FPs store the energy of the SPs as rotations defining angular momenta, allowing the description of the interactions between SPs as the interactions between the angular momenta of their FPs. All SPs interact permanently so that the local physical laws are determined by the large-scale structure of the universe according to Ernst March's principle. The main finding of the approach is that many concepts introduced by the SM like gluons, gravitons, dark mater, dark energy, expansion of the universe, equivalence principle, etc. are the product of the inadequate representation of SPs. The approach derives all four known forces as electromagnetic interactions and is compatible with Quantum Mechanics. Another important finding is the interaction of light with the measuring instruments, which together with the emission of light with speed 'c' relative to its source and absolute time and space, leads to Galilean relativity multiplied with the gamma factor. No unphysical concepts like time dilation and length contraction are required. More at www.odomann.com

MP 14.4 Fr 9:00 HS 23

**On a fractional differential problem of Lane Emden type** — •Zoubir DAHMANI[1] and Yasmina BAHOUS[2] — [1]Laboratory LMPA, UMAB Mostaganem — [2]Department of Math-Info, UMAB

In this presentation, using fractional calculus, we present recent results on a problem of differential equations of Lane Emden type. Some existence and uniqueness results are obtained. Some recent stability phenomena of the considered problem are aslo studied. At the end, an illustrative example is discussed.

MP 14.5 Fr 9:00 HS 23

**Decoherence of quantum registers** — •Javeria Khan[1], Imran Ahmed Siddiqui[2], and Piero Nicolini[3] — [1]Goethe-Universität Frankfurt am Main. — [2]University of Karachi, Pakistan — [3]Goethe-Universität Frankfurt am Main, Germany

This study is motivated by the observation (widely believed but unproven) that classical systems cannot simulate highly entangled quantum systems efficiently, and we hope to hasten the day when well controlled quantum systems can perform tasks surpassing what can be done in the classical world. To operate a large scale quantum computer reliably we will need to overcome the debilitating effects of decoherence, Starting from the dynamical evolution of a quantum register of arbitrary length coupled to an environment of arbitrary coherence length is predicted within a relevant model of decoherence. We have revisited a model of decoherence based upon the one previously studied by Leggett in connection with tunneling problem in the presence of dissipation. The results are reported for both independent decoherence and collective decoherence, for both cases explicit decoherence functions are derived and it is shown that the decay of the coherences of the register is strongly depend on the input state. Our results lead to the identification of decoherence free states in the collective decoherence limit. Only by challenging the entanglement frontier and by tackling decoherence we will learn whether Nature provides extravagant resources far beyond what the classical world would allow. Keywords: decoherence, entangled, evolution, states.