



Contribution ID: 39

Type: **Non-Invited Talk**

Chiral symmetry-breaking schemes and dynamical generation of masses and field mixing

Thursday 29 November 2018 14:50 (25 minutes)

A careful study of flavor mixing in Quantum Field Theory reveals an hidden structure, which is due to the presence of Bogoliubov transformations in addition to the mixing rotation [1].

This is deeply related to the presence of unitarily inequivalent representations of the field algebra [2]. Far from being only a mathematical curiosity, this study leads to phenomenological corrections to the neutrino oscillations formula [3]. The extension of the previous analysis to the three flavor case was performed in Ref.[4] where the structure of flavor charges and currents was analyzed and CP and T violations were explicitly evaluated.

The particle-antiparticle condensate structure of the flavor vacuum suggests the idea of fermion mixing as an emergent dynamical phenomenon [5]. A non-perturbative study of two-flavor chiral symmetric models was performed by means of algebraic methods and the emergence of Nambu-Goldstone modes was analyzed by means of the Ward-Takahashi identities [6]. This study shows that dynamical generation of flavor mixing requires the existence of exotic condensates in the vacuum, mixing different flavors with each other. We are currently investigating the extension to the three-flavor case with CP -violating phase and the associated patterns of symmetry breaking [7].

References

- 1) M.Blasone, M.V.Gargiulo and G.Vitiello,
Phys. Lett. B 761, 104 (2016).
- 2) M.Blasone and G.Vitiello,
Ann. Phys. (N.Y.) 244 (1995) 283;
- 3) M.Blasone, P.A.Henning and G.Vitiello,
Phys. Lett. B 451 (1999) 140;
- 4) M.Blasone, A.Capolupo and G.Vitiello,
Phys. Rev. D 66 (2002) 025033;
- 5) M.Blasone, P.Jizba, G.Lambiase and N.E.Mavromatos,
J. Phys. Conf. Ser. 538 (2014) 012003;
- 6) M.Blasone, P.Jizba, N.E.Mavromatos and L.Smaldone,
Chiral symmetry-breaking schemes and dynamical generation of masses and field mixing, arXiv:1807.07616 [hep-th].
- 7) M.Blasone, P.Jizba, N.E.Mavromatos and L.Smaldone, work in progress.

Content of the contribution

Theory

Primary author: Prof. MASSIMO, Blasone

Co-authors: Prof. PETR, Jizba; Prof. NICK, Mavromatos; Dr LUCA, Smaldone

Presenter: Prof. MASSIMO, Blasone

Session Classification: Neutrino masses, mixing and discrete symmetries

Track Classification: [4] Neutrino masses, mixing and discrete symmetries