Contribution ID: **2** Type: **Talk**

Exorcizing a Model of Fuzzy Electroweak Interactions

Wednesday 24 April 2024 12:00 (15 minutes)

Inspired by tower truncation in string field theory, weakly nonlocal (WNL) quantum field theories (QFT's) have been proposed to soften the UV behavior in particle physics for naturalness and quantum gravity. Pseudo-differential form factors preclude the appearance of pathological ghosts in the particle spectrum, contrary to local higher-derivative field theories à la Lee-Wick. However, when spontaneous symmetry breaking occurs, these string-inspired QFT's generally develops an infinite tower of ghosts in the physical vacuum at tree-level. In this talk, I will discuss a class of fuzzy QFT's (with a new covariant star-product of fields) that naturally avoids this problem. Then, I will use this formalism to define the Fuzzy Standard Model: a WNL deformation of the Standard Model, where electroweak symmetry breaking is realized without ghosts. The talk is based on arXiv:2307.11741 and arXiv:2311.08311

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Session Classification: Morning