

Enhanced Axion-Photon Coupling in a GUT with Hidden Photon

Tuesday, 13 February 2018 16:50 (20 minutes)

There is a novel way to achieve the gauge coupling unification with an unbroken $U(1)$, where the unification behavior is rather insensitive to the physics at intermediate scales. In this scheme, a hidden gauge coupling and a kinetic mixing are expected to be large. Consequently, a coupling of a QCD axion to the visible photon is significantly enhanced compared to conventional axion models. We show that this GUT scheme with the QCD axion can be testable by various future experiments.

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Session Classification: Short Talks