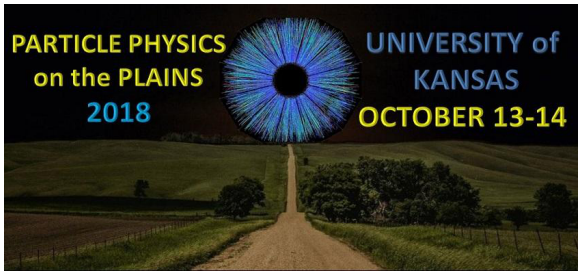

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Gravity safe, electroweak natural axionic solution to strong CP and SUSY μ problems

Sunday 14 October 2018 12:05 (20 minutes)

Particle physics models with Peccei-Quinn (PQ) symmetry breaking as a consequence of supersymmetry (SUSY) breaking are attractive in that they solve the strong CP problem with a SUSY DFSZ-like axion, link the SUSY breaking and PQ breaking intermediate mass scales and can resolve the SUSY μ problem with a naturalness-required weak scale μ term whilst soft SUSY breaking terms inhabit the multi-TeV regime as required by LHC sparticle mass limits and the Higgs mass measurement. On the negative ledger, models based on global symmetries suffer a generic gravity spoliation problem. We present two models based on the discrete R-symmetry Z_{24}^R–which may emerge from compactification of 10-d Lorentzian spacetime in string theory–where the μ term and dangerous proton decay and R-parity violating operators are either suppressed or forbidden while a gravity-safe PQ symmetry emerges as an accidental approximate global symmetry leading to a solution to the strong CP problem and a weak-scale/natural value for the μ term.

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