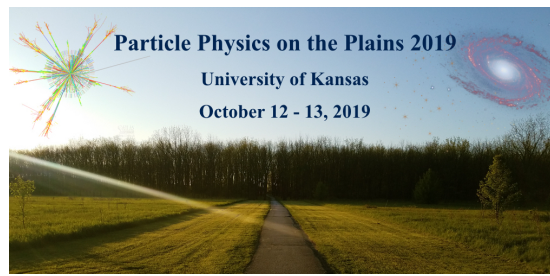


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An Emergent Solution to the Strong CP Problem

We construct a theory in which the solution to the strong CP problem is an emergent property of the background of the dark matter in the Universe. The role of the axion degree of freedom is played by multi-body collective excitations similar to spin-waves in the medium of the dark matter of the Galactic halo. The dark matter is a vector particle whose low energy interactions with the Standard Model take the form of its spin density coupled to $G\tilde{G}$, which induces a potential on the average spin density inducing it to compensate $\bar{\theta}$, effectively removing CP violation in the strong sector in regions of the Universe with sufficient dark matter density. We discuss the viable parameter space, finding that light dark matter masses within a few orders of magnitude of the fuzzy limit are preferred, and discuss the associated signals with this type of solution to the strong CP problem.

Author: TAIT, Tim M.P. (University of California, Irvine)

Presenter: TAIT, Tim M.P. (University of California, Irvine)

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