## Phenomenology 2019 Symposium



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## Dynamical Relaxation of Axion Misalignment in the Early Universe

Monday 6 May 2019 15:30 (15 minutes)

The QCD axion is a viable dark matter candidate as the misalignment mechanism can furnish the observed dark matter abundance. Although a wide range of axion decay constants  $f_a$  are compatible with astrophysical bounds, very large  $f_a \sim \mathcal{O}(10^{17} - 10^{18})$  GeV (and small  $f_a \sim \mathcal{O}(10^9 - 10^{10})$  GeV) values require a misalignment angle  $\theta_{\rm mis} \ll 1$  ( $\pi - \theta_{\rm mis} \ll 1$ ) which presents a fine-tuning problem. These decay constant values are within projected experimental sensitivity of planned and proposed experiments, which further motivates their investigation. I will present a new mechanism, called Dynamical Axion Misalignment Production (DAMP), wherein these misalignment angles arise naturally. In addition to the presenting criteria for a DAMP model I will discuss, as a proof of principle, a set of SUSY QCD models which exhibit DAMP. These models predict a precise value for  $f_a$  and the absence of isocurvature perturbations.

## Summary

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