

Unraveling the Particle World and the Cosmos at Berkeley—Workshop in Honor of Lawrence Hall and Hitoshi Murayama



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String theory axion strings and QCD axion mass prediction

The QCD axion may solve the strong CP problem and constitute the dark matter (DM) abundance in our Universe. I discuss how the cosmology of string theory axions is fundamentally different from that of Peccei-Quinn (PQ) field theory axions. In particular, while field theory axions may form axion strings if the PQ phase transition occurs after inflation, string theory axions do not generically form strings. However, they may form in special inflationary paradigms such as brane inflation—in such cases I discuss what to expect for the QCD axion DM abundance and gravitational wave signals. Lastly, I discuss ongoing work to refine the computation of the QCD axion mass from the most precise and accurate lattice simulations to-date of axion-string networks.

Title

Abstract

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