



Tuesday

February 20

4:00 P.M.

Rm 415 NSH

## QCD Axion Dark Matter with $f_a$ as Low as $10^8$ GeV

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The QCD axion elegantly solves the longstanding strong CP problem and is well motivated dark matter candidate. To reproduce the observed dark matter abundance with axions, the decay constant  $f_a$  is considered to be around  $10^{12}$  GeV for the misalignment mechanism. On one hand, the late-time entropy production is known to allow larger  $f_a$ . On the other hand, the decay of the axion domain walls and strings can generate axion dark matter with  $f_a$  around  $10^{11}$  GeV. We propose a new mechanism for QCD axion dark matter with  $f_a$  as low as  $10^8$  GeV, where the axion abundance is produced from parametric resonance of the oscillating Peccei-Quinn symmetry breaking field. Several experimental efforts are currently devoted to axion searches in this range of  $f_a$ . Other potential signatures include dark radiation and warmness of dark matter. We realize this framework within various particle physics models, demonstrating complete and viable cosmologies.