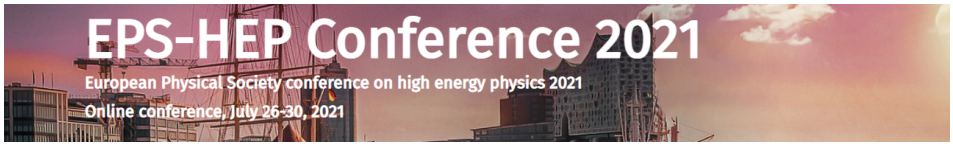

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Photophilic hadronic axion from heavy magnetic monopoles

Thursday, 29 July 2021 10:10 (20 minutes)

We propose a model for the QCD axion which is realized through a coupling of the Peccei-Quinn scalar field to magnetically charged fermions at high energies. We show that the axion of this model solves the strong CP problem and then integrate out heavy magnetic monopoles using the Schwinger proper time method. We find that the model discussed yields axion couplings to the Standard Model which are drastically different from the ones calculated within the KSVZ/DFSZ-type models, so that large part of the corresponding parameter space can be probed by various projected experiments. Moreover, the axion we introduce is consistent with the astrophysical hints suggested both by anomalous TeV-transparency of the Universe and by excessive cooling of horizontal branch stars in globular clusters. We argue that the leading term for the cosmic axion abundance is not changed compared to the conventional pre-inflationary QCD axion case for axion decay constant $f_a > 10^{12}$ GeV.

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