

## Challenges for a QCD Axion at the 10 MeV Scale

*Monday, 16 August 2021 17:25 (15 minutes)*

We report on an interesting realization of the QCD axion, with mass in the range  $\mathcal{O}(10)$  MeV. It has previously been shown that although this scenario is stringently constrained from multiple sources, the model remains viable for a range of parameters that leads to an explanation of the Atomki experiment anomaly. In this article we study in more detail the additional constraints proceeding from recent low energy experiments and study the compatibility of the allowed parameter space with the one leading to consistency of the most recent measurements of the electron anomalous magnetic moment and the fine structure constant. We further provide an ultraviolet completion of this axion variant and show the conditions under which it may lead to the observed quark masses and CKM mixing angles, and remain consistent with experimental constraints on the extended scalar sector appearing in this Standard Model extension. In particular, the decay of the Standard Model-like Higgs boson into two light axions may be relevant and leads to a novel Higgs boson signature that may be searched for at the LHC in the near future.

**Primary author:** LIU, Jia (Peking University)

**Presenter:** LIU, Jia (Peking University)

**Session Classification:** Parallel Session I: TeV and BSM Physics

**Track Classification:** 1. TeV 物理和超出标准模型新物理