

## **Thermal axions with multi-eV masses are possible in low-reheating scenarios**

*Monday, 30 August 2021 17:45 (15)*

We revise cosmological mass bounds on hadronic axions in low-reheating cosmological scenarios, with a reheating temperature  $T_{\text{RH}} \leq 100$  MeV, in light of the latest cosmological observations. In this situation, the neutrino decoupling would be unaffected, while the thermal axion relic abundance is suppressed. Moreover, axions are colder in low-reheating temperature scenarios, so that bounds on their abundance are possibly loosened. As a consequence of these two facts, cosmological mass limits on axions are relaxed. Using state-of-the-art cosmological data and characterizing axion-pion interactions at the leading order in chiral perturbation theory, we find in the standard case an axion mass bound  $m_a < 0.26$  eV. However, axions with masses  $m_a \simeq 1$  eV, or heavier, would be allowed for reheating temperatures  $T_{\text{RH}} < 80$  MeV. Multi-eV axions would be outside the mass sensitivity of current and planned solar axion helioscopes and would demand new experimental approaches to be detected.

### **Reference to paper (DOI or arXiv)**

2104.03982

### **Your gender (free text)**

**Primary author(s)** : CARENZA, Pierluca (Bari University & INFN Bari); LATTANZI, Massimiliano (Universita' di Ferrara); MIRIZZI, Alessandro (Bari University); FORASTIERI, Francesco (IFN Ferrara)

**Presenter(s)** : CARENZA, Pierluca (Bari University & INFN Bari)

**Session Classification** : Discussion Panel Cosmology 1

**Track Classification** : Cosmology and particle physics