Contribution ID: **27** Type: **not specified**

Exploring the Dark Universe: A European Strategy for Axions and other WISPs Discovery

Axions and other very weakly interacting slim (with $m < 1$ GeV) particles (WISPs) are a common feature of several extensions of the Standard Model of Particle Physics. The search of WISPs was already recommended in the last update of the European strategy on particle physics (ESPP). After that, the physics case for WISPs has gained additional momentum. Indeed, WISPs may provide a new paradigm to explain the nature of dark matter and puzzling astrophysical and particle physics observations. This document briefly summarizes current searches for WISPs and the perspectives in this research field for the next decade, ranging from their theoretical underpinning, over their indirect observational consequences in astrophysics, to their search in laboratory experiments. It is stressed that in Europe a rich, diverse, and low-cost experimental program is already underway with the potential for one or more game-changing discoveries. In this context, it is also reported the role of the EU funded COST Action "Cosmic WISPers in the Dark Universe: Theory, astrophysics, and experiments" (CA21106, https://www.cost.eu/actions/CA21106) in coordinating and supporting WISPs searches in Europe, shaping a roadmap to track the strategy to guarantee a European leadership in this field of research.

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