Contribution ID: 3

Long-lived Particles at the FCC-ee

Many physics problems such as the nature of dark matter predict particles with long lifetimes as an important possibility in the search for new phenomena. When produced at colliders, these long-lived particles (LLPs) have a distinct experimental signature: they can decay far from the collision point, or even completely pass through a detector before decaying. Since most of the trigger and reconstruction algorithms are optimized for short-lived particles, searches for LLPs can be challenging, usually requiring dedicated methods and sometimes also dedicated hardware to spot them. This project aims to study the sensitivity that a proposed circular electron-positron collider, the FCC-ee, will have to LLPs. The clean collision environments at electron-positron colliders will provide exciting opportunities to search for several types of LLPs. This project will focus on one example LLP physics case, namely, axion-like particles (ALPs), which were introduced in the 1980s in theories beyond the standard model to address the strong CP problem. Building on previous work, the student will analyze a long-lived ALP signature in the future FCC-ee environment.

70% physics, 30% computing, 0% engineering

Field

B1: Particle physics analysis (software-oriented)

DESY Place

Hamburg

DESY Division

FH

DESY Group

CMS

Special Qualifications:

The student should have a basic understanding of and experience with Linux and C++/python programming. Experience with ROOT and RDataFrame is a plus. Advanced lectures in particle physics would be helpful.

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