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Searches for feebly interacting new particles at FCC-ee

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The electron-positron stage of the Future Circular Collider (FCC-ee) is a frontier factory for Higgs, electroweak, QCD and flavour physics. It is designed to operate in a 100 km circular tunnel built at CERN, and will serve as the first step towards 100-TeV proton-proton collisions. In addition to an essential and unique Higgs program, FCC-ee offers powerful opportunities to discover direct or indirect evidence of physics beyond the Standard Model. Direct searches for long-lived particles at FCC-ee could be particularly fertile in the high-luminosity Z run, where $5 \cdot 10^{12}$ Z bosons are anticipated to be produced for the configuration with two interaction points. The very large samples of Higgs bosons, W bosons and top quarks in very clean experimental conditions could offer additional opportunities at other collision energies. Three physics cases producing long-lived signatures at FCC-ee are highlighted and studied in this contribution: heavy neutral leptons (HNLs), axion-like particles (ALPs), and exotic decays of the Higgs boson. These searches motivate out-of-the-box optimization of experimental conditions and analysis techniques, that could lead to improvements in other physics searches.

In-person participation

No

Primary author: SFYRLA, Anna

Presenter: SFYRLA, Anna

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