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BSM physics opportunities at the FCC-ee

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The electron-positron stage of the Future Circular Collider (FCC-ee) is a precision frontier factory for Higgs, electroweak, flavour, top quark, and QCD physics. It is designed to operate in a 91-km circular tunnel built at CERN, and will serve as the first step towards O(100 TeV) proton-proton collisions. In addition to an essential Higgs program, the FCC-ee offers unique and powerful opportunities to answer fundamental open questions and explore unknown physics beyond the Standard Model. Direct searches for long-lived particles, and indirect probes of new physics sensitive to several tens of TeV scale, will be particularly fertile in the high-luminosity Z run, where 8×10^{12} Z bosons are expected. The large data samples of Higgs bosons, W bosons, and top quarks in very clean experimental conditions will offer additional opportunities for discoveries at other collision energies. Three concrete physics cases with promising signatures at FCC-ee will be discussed: heavy neutral leptons (HNLs), axion-like particles (ALPs), and exotic decays of the Higgs boson. These three well-motivated cases motivate out-of-the-box optimization of experimental conditions and analysis techniques that could lead to improvements in other searches for new physics.

Secondary track

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