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Long-Lived Particle Searches at a Future Higgs Factory with the ILD experiment

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Future e^+e^- colliders provide a unique opportunity for long-lived particle (LLP) searches. We present a full simulation study of LLP searches using the International Large Detector (ILD), a detector concept for a future Higgs factory, with a gaseous time projection chamber as its main tracking device. Signatures of displaced vertices and kinked tracks are explored. We study challenging final states involving both very soft displaced tracks and boosted, nearly collinear tracks. Backgrounds from beam-induced interactions and other Standard Model processes are considered. We present expected exclusion limits for a model-independent analysis, as well as for Higgs boson decays to LLPs, for a range of LLP lifetimes.

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