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A hybrid, asymmetric, linear Higgs factory (HALHF)

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Construction of a Higgs factory is the top priority for particle physics in the next decades, but the costs are prohibitively high. Plasma-wakefield accelerators (PWFAs) promise to drastically reduce the footprint and therefore the cost of such machines. However, while progress on electron acceleration is rapid, positron acceleration in plasma remains challenging. We propose a linear-collider concept that bypasses the positron problem by using PWFAs to accelerate electrons and conventional RF accelerators to accelerate positrons. This hybrid scheme requires the beam energies to be highly asymmetric, and, we argue, benefits from the use of asymmetric bunch charges as well as asymmetric transverse emittances. This talk presents an overview of the HALHF concept and the R&D required to implement it.

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