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Physics Performance and Detector Requirements at an Asymmetric Higgs Factory

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Recently, a concept for a Hybrid Asymmetric Linear Higgs Factory (HALHF) has been proposed, where a center-of-mass energy of 250 GeV is reached by colliding a plasma-wakefield accelerated electron beam of 500 GeV with a conventionally accelerated positron beam of about 30 GeV. While clearly facing R&D challenges, this concept bears the potential to be significantly cheaper than any other proposed Higgs Factory, comparable in cost e.g. to the EIC. The asymmetric design changes the requirements on the detector at such a facility, which needs to be adapted to forward-boosted event topologies as well as different distributions of beam-beam backgrounds. This contribution will give a first assessment of the impact of the accelerator design on the physics prospects in terms of some flagship measurements of Higgs factories, and how a detector would need to be adjusted from a typical symmetric Higgs factory design.

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