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Higgs factories based on Photon Colliders

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Producing high peak and average power lasers with high efficiency, as proposed by the International Coherent Amplification Network (ICAN) group, will open a new era in particle accelerator physics and will allow us to construct the first high energy photon-photon collider (ggC). Among the various options for Higgs factories, a ggC has the distinct advantage of not requiring a positron source and only needing relatively low energy electron beams, while the main challenge comes from the high power laser requirements needed to produce the high energy photon beam from Compton backscattering.

The physics motivation and the designs for several ggCs, based on recirculating e- linacs and the high power fiber laser technology been developed by ICAN group, will be presented. The two main designs to be discussed, SAPPHIRE (Small Accelerator for Photon-Photon Higgs production using Recirculating Electrons) at CERN and HFiTT (Higgs Factory in Tevatron Tunnel) at Fermilab, have very similar laser requirements and will produce 10,000 Higgs per year.

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