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Theoretical Prediction for Double Higgs Production via Photon Fusion at Muon Colliders

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Double Higgs production plays a crucial role in assessing the Higgs self-coupling (trilinear Higgs coupling), responsible for endowing elementary particles with mass and shaping the Higgs potential. Measuring the trilinear Higgs coupling at proton colliders necessitates high luminosity due to the rarity of processes involving it in the Standard Model. Nonetheless, Muon colliders offer distinct advantages over proton colliders, potentially mitigating some measurement challenges associated with the trilinear Higgs coupling. In my research, I have focused on investigating the production of two Higgs particles through the interaction of high-energy muon beams emitting collinear photons. Specifically, I employed both the Effective Photon Approximation (EPA) method and LePDF to establish parton distribution functions (PDFs) and determine the total cross sections of these processes. This analysis was conducted within the framework of the Higgs Triplet Model. In this presentation, I will discuss our latest results for various scenarios.

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