

Investigating Gluon Fusion as New Channel to Search for Dark Matter

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In Higgs portal models, it is predicted that the Higgs boson could decay into dark matter particles. We may be able to detect these processes with the ATLAS detector, located at the Large Hadron Collider in Geneva Switzerland. There are many different production modes of the Higgs boson that could be used in a search for these Higgs boson to invisible decays, and when used together they provide our best chance at discovering new physics. Previous work has been done with vector-boson fusion production (VBF), but gluon fusion (ggF) production has a larger cross section, making it a promising candidate to aid in the search. Therefore, we are investigating the feasibility of using a MET+photon trigger at ATLAS to provide sensitivity to ggF production of the Higgs boson; Large MET is characteristic of any Higgs boson to invisible decay, and the photon requirement would provide sensitivity to $H \rightarrow \gamma\gamma_d$ decays, where γ_d is a dark photon.

Career stage

Undergraduate student

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