

Higgs Production through Gluon Fusion and Plausible Dark Matter Studies

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The Standard Model of particle physics is, so far, the best description of elementary particle dynamics and interactions. However, while it explains many of the phenomena we observe in experiment, there are shortcomings. It is therefore essential for particle physicists to have a clear understanding of the theory which makes up the Standard Model, as well as possible additions to the Standard Model which better explain experimental anomalies. In terms of theory, a gluon fusion loop diagram has been evaluated in an attempt to find an analytic form of its partonic cross section. In terms of exploring physics beyond the Standard Model, a minimal Z' model has been tested as a dark matter candidate in pp collisions. Computational studies of this model show that a Z' having a mass of $\sim 100\text{GeV}$ could be considered as a dark matter candidate, although further study is needed to gain a deeper understanding of this.

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