

Higgs Production Enhancement in P-P Collision Using Monte Carlo Techniques at $\sqrt{s} = 13$ TeV

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ABSTRACT

Precise study for the possibility of enhancement of Higgs boson production in pp collision at ultra-relativistic energies throughout promotion of the gluon distribution function inside the protons before the collision is presented here. The study is based mainly on the available Monte Carlo event generators (PYTHIA 8.1, Sherpa 2.1.0) running on PCs and CERN X-Machine using the invariant mass extended technique. Generated samples from PYTHIA 8.1 and SHERPA 2.1.0 at $\sqrt{s} = 13$ TeV are used in the investigation of the effect of replacing parton distribution function (PDF) on the Higgs production enhancement. The CTEQ66 and MSRTW2004nlo parton distribution functions are used alternatively on PYTHIA 8.1 and SHERPA 2.1.0 event generators in companion with the effects of allowing initial state and final state radiations (ISR and FSR) to obtain evidences on the enhancement of the SM-Higgs production depending on the field theoretical model of SM. It is found that, the replacement of PDFs will lead to a significant change in the SM-Higgs production, and the effect of allowing or denying any of ISR or FSR is sound for the two event generators but may be unrealistic in PHYTIA 8.1.

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