Abstract Submitted
for the TSF19 Meeting of
The American Physical Society

Study of the Kinematics of the Process $H^0 \to gg \to b\bar{b}b\bar{b}$ at the Large Hadron Collider with the ATLAS Experiment[1] JARED BURLESON, STEPHEN SEKULA, REBECCA MOORE, Southern Methodist University, ATLAS COLLABORATION — This report concerns a summary of the work done during our summer research project. This report is a condensed analysis of the kinematic study of the characteristics of simulation models that represent expected detection elements produced by the ATLAS Experiment at the Large Hadron Collider, LHC. The analysis of the data was done primarily through the programming language python and its data science library classes. This study is done primarily to show that the identification of a particular Higgs process is incredibly difficult when considering other background processes that could be interpreted as false-positives in an isolated analysis. From our analysis of the kinematics of these processes, we also explore the beginnings of training a machine-learning algorithm, through one of python's machine-learning libraries, to distinguish Higgs processes based on the kinematic data available to a detection model. The purpose of this study is to demonstrate the potential capability of a collider experiment in searching for the process $H^0 \to gg \to b\bar{b}b\bar{b}$.

[1]Acknowledgment of Funding to the following programs and institutions: Hamilton Undergraduate Research Scholars Program, US ATLAS SUPER Project, and SMU Department of Physics

Jared Burleson
Southern Methodist University

Date submitted: 13 Sep 2019 Electronic form version 1.4