

Abstract Submitted
for the APR20 Meeting of
The American Physical Society

Search for New Scalar Particles: Selection Efficiency¹ TOWSIFA AKHTER, Pennsylvania State University, ATLAS COLLABORATION² — Finding the existence of new scalar particles can explain the incompleteness of the Standard Model and give rise to New Physics. The theoretical spin-0 particles **X** and **S** at a proton-proton collision of 13 TeV center of mass energy can indicate about gravitons if discovered. The **X** particle decays into a Higgs boson and an **S** particle, both of which further decay into other hadrons. Monte Carlo simulations were utilized for the invariant mass calculations. Different boosted signature parameters were tested with the simulations to check selection viability and efficiency. Using the simulations, we found that at lower mass **S** particles, for 2 TeV **X** particle, the fully boosted parameter is the most efficient signature, while at higher mass **S** particles, the combination of all boosted signatures provides the most efficient result. Similar results can be seen when we specifically inspected the Higgs boson decaying into bottom quarks channel.

¹National Science Foundation

²The Oklahoma State University group of the ATLAS experiment at CERN.

Towsifa Akhter
Pennsylvania State University

Date submitted: 09 Jan 2020

Electronic form version 1.4