

Abstract Submitted
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Improved Simulations for New Physics Searches at ATLAS NAVID RAD, CSU Fresno, ATLAS, CERN COLLABORATION — ATLAS experiment at the Large Hadron Collider (LHC) of CERN is designed to make new discoveries in particle physics. Some of the possible findings are the Higgs boson, supersymmetry (SUSY), extra spatial dimensions, micro-black holes and a whole zoo of other exotic possibilities. However, before looking for these new possibilities, one needs to verify our current theories and understanding of physics at the level of Quantum Chromodynamics (QCD). Since HEP experiments look for rare events, the amount of data that needs to be analyzed is astronomical. Also the fact that the comparison of the experiment to data is often done by using event generators such as Pythia makes the process of analysis extremely time consuming. The purpose of this research project is to utilize and develop additional software tools in order to decrease the time and computing power required for calculations done at ATLAS. The APPLgrid software package allows for quick calculations with any parton distribution function (PDF) which could take only a few milliseconds where as the same calculation using Pythia could take weeks for each PDF. The results that will be shown in this presentation are some sample calculations done by APPLgrid and also the comparison with similar calculations done by Pythia at the level of QCD and beyond. This is a research project the author did at CERN during the summer of 2011.

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