

NWS11-2011-000018

Abstract for an Invited Paper
for the NWS11 Meeting of
the American Physical Society

Searches for the Higgs Boson and Physics Beyond the Standard Model with ATLAS at the LHC

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The Large Hadron Collider has run extraordinarily well since its first collisions in late 2009, and has already delivered more than 2.5 inverse femtobarns of data to each of the multipurpose detectors, ATLAS and CMS. The detectors, unprecedented in their scale and complexity, have also been remarkably quick to commission and calibrate with beams, so that even complex capabilities requiring a detailed understanding of the detector performance, such as b-quark tagging and missing transverse energy measurements, have become routine parts of the experimental toolkit. This remarkable performance by accelerator and detector has made it possible to measure a broad range of Standard Model processes at the LHC, quickly and over vast ranges. These measurements allow for detailed studies of the backgrounds to possible new processes, as well as for quick tuning and validation of Monte Carlo simulations at LHC energies, allowing us to search for a large number of Higgs boson and new physics signatures, including Supersymmetry and other models with Dark Matter candidates, new gauge bosons, or compositeness. The results are beginning to put very severe constraints on the Standard Model, and to exclude large regions of phase space for many new physics models. It is beginning to look as if particle physics will take an interesting and unexpected turn in the near future.