

**Stony Brook University
The Graduate School**

Doctoral Defense Announcement

Abstract

A Search for First Generation Leptoquarks in $s^{1/2} = 7$ TeV pp Collisions with the ATLAS
Detector at the LHC

By

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The Standard Model (SM) is an incomplete theory of nature. Numerous extensions of the SM predict the existence of leptoquarks (LQ), color-triplet bosons which carry both baryon and lepton number. The results of a search for pair production of first generation scalar leptoquarks in the $eE_T^{\text{miss}}jj$ final state are reported. The search is performed in pp collisions corresponding to an integrated luminosity of 1.03 fb^{-1} at a center-of-mass energy $s^{1/2} = 7$ TeV, recorded with the ATLAS detector at the LHC. A multivariate discriminant is used to distinguish signal-like events from background-like events. Observations are consistent with expectations from SM backgrounds, thus limits on allowed leptoquark mass are determined. First generation scalar leptoquarks with mass $m_{LQ} < 558$ GeV are excluded at a 95% confidence level, when assuming $\beta \equiv \text{BR}(LQ \rightarrow ej) = 0.5$. When combined with a complimentary search in the $eejj$ final state, leptoquarks with mass $m_{LQ} < 607$ (660) GeV are excluded, assuming $\beta = 0.5$ (1.0). These are the strongest limits in existence.

Date: May 8, 2012

Time: 2pm

Place: Physics Building, D-122

Program: Physics

Dissertation Advisors: Michael Rijssenbeek
and Dmitri Tsybychev