Stony Brook University
The Graduate School

Doctoral Defense Announcement

Abstract

Investigating Electroweak Physics in Large Hadron Collider

By

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The basic principle of naturalness has driven the majority of the LHC program, but so far all searches for new physics beyond the Standard Model(SM) have come up empty. On the other hand, a few existing measurements of SM processes contain interesting anomalies, for instance in the measurement of the WW cross section. The deviation of WW cross section was seen both at CMS and ATLAS and both at 7 and 8 TeV. The discrepancy also became larger at 8TeV. Combined results with LHC 7TeV and 8TeV implies around a three sigma deviation from the SM NLO calculation. It allows for the possibility of new physics with mass scales very close to the Electroweak Scale. We show the addition of physics beyond the SM at electroweak scale can improve the agreement with the data. In particular supersymmetric models involving charginos, stops and sleptons all provide better fits with the date. In the case of models of sleptons that agree better with the WW data, they can also explain dark matter and the (g-2) anomaly. Furthermore, we show that there are several different classes of stop driven scenarios that not only evade all direct searches, but improve the agreement with the data in the SM measurement of the WW cross section.

Date: March 17, 2015
Time: 10:30 AM
Place: Math Tower 6125

Program: Physics & Astronomy
Dissertation Advisor: Prof. Patrick Meade